



SATURDAY, DECEMBER 2, 1871.

Contributions.

NARROW-GAUGE FREIGHT-CAR.

It gives us pleasure to be able to present our readers with an accurate engraving of a narrow-gauge freight-car, for the drawing of which and the following letter we are indebted to Mr. Schuyler, the Secretary of the Denver & Rio Grande Railroad. A review of Mr. Schuyler's reasoning and some consideration of the effect of gauge on the weight of cars will be found on our editorial page:

TO THE EDITOR OF THE RAILROAD GAZETTE:

It had not been my intention to write or print anything further upon a subject which has so many able advocates and about which so much has already been written, until such time as the completion of some of the many narrow-gauge roads now under construction should place in our hands statistics derived from actual American practice to take the place of those gathered from foreign practice,

your very careful consideration of it. Being the first yet built for this gauge, it is likely, of course, to have many imperfections. I do not, therefore, present it as a model, but merely as an illustration of what may be done with that class of stock on the 3-foot gauge, and of the justice of the comparisons which have been already made. The dimensions of this car are as follows:

Length of frame over all.....	23 feet 7 inches.
Width.....	6 " "
Height of floor above rail.....	2 " 4 "
Length of box.....	22 " 1 inch.
Width of box outside.....	6 " 2 inches.
Height in center.....	6 " "
Diameter of wheel.....	20 " "
Angle of stability empty.....	56 degrees.
" " loaded with 11,800 lbs. cotton.....	38 " "
" " " " 17,600 lbs. wheat.....	51 " "
Floor area.....	132 square feet.
Cubic space in box.....	792 feet.
Weight.....	8,860 lbs.
Capacity.....	17,600 lbs.
Proportion of dead to paying weight.....	1 to 2

The dimensions of each part of the car are given, so that whosoever will may calculate, each in his own fashion, the weight and strength of the car. The weights here given are taken from the scale records at the shops and vouched for by the makers as correct.

The weight given for oak seems light, but it is the average of all the dressed oak used in the car, the material being the best Pennsylvania white oak.

No. feet oak, 800, at 4 lbs. per foot.....	3,440
" " pine, 515, at 2 lbs. " ".....	1,030
Wrought iron, steel, brass and rubber.....	1,330
Cast iron.....	910
Wheels and axles.....	2,080

Total..... 8,790

The capacity of the box-car is given by the makers as

of this latter car as compared with the first to be as 95 to 100—that is, on a total floor area of 132 feet it is as safe with a load of 19,000 lbs. as the Pennsylvania Railroad car having a floor area of 221 feet is with a load of 20,000 lbs. I think we are perfectly safe, therefore, in placing the capacity of this car at 17,600 lbs., or 2 to 1 of weight. A platform and a gondola are the other cars belonging to this set. They are of precisely the same pattern and size in all respects, excepting, of course, that of the superstructure. A tabular statement will show them better:

CLASSES OF CARS.	WEIGHT.			Capacity.
	Running gear.	Platform.	Super-structure.	
Platform.....	2,600	3,650		19,000
Gondola.....	2,600	3,650	1,000	18,000
Box.....	2,600	3,650	2,550	17,600
Average.....			7,443	18,200

CLASSES OF CARS.	Gross load on each wheel.	COST.		Proportion of dead to paying load.
		Total.	For 1,000 lbs. capacity.	
Platform.....	3,156	350	\$18 42	1 to 3.04
Gondola.....	3,156	385	\$19 39	1 to 2.48
Box.....	3,300	450	\$25 71	1 to 2.30
Average.....		395	\$21 15	1 to 2.45

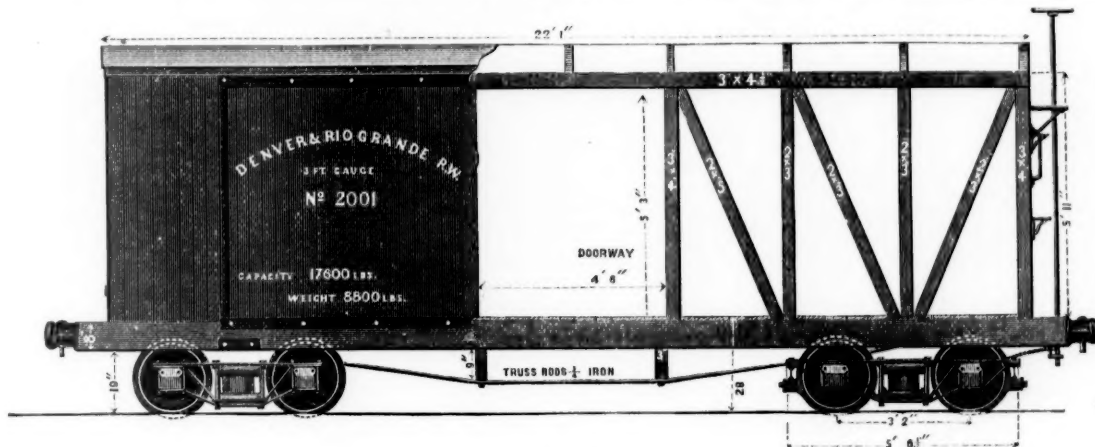


Fig. 1.

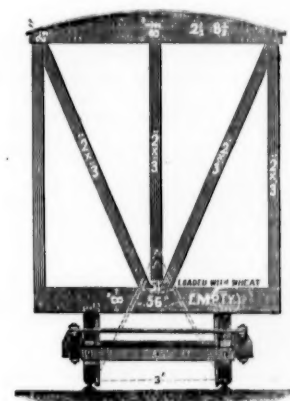


Fig. 2.

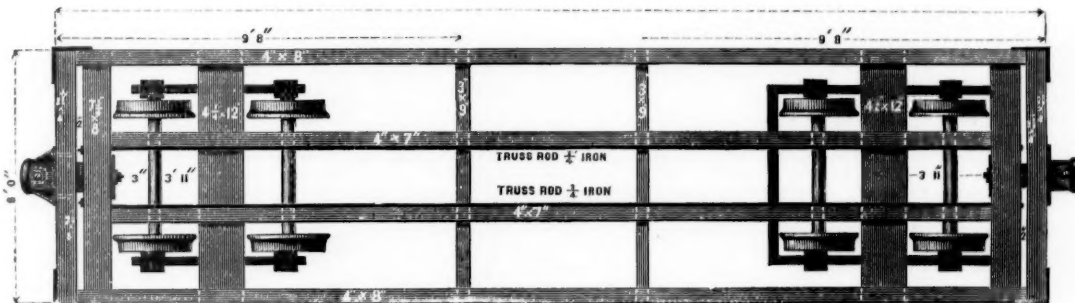


Fig. 3.

NARROW-GAUGE FREIGHT-CAR.

which, however valuable in itself, must necessarily differ from ours as widely as the broader systems on each side of the ocean have always differed; but in one of your late issues containing a criticism on a letter signed "H. B. W." to the New York World, I notice many statements and comparisons which, though no doubt honestly made, coming from such a source, are likely to have an injurious effect upon the minds of those accustomed to read and to some extent be guided by the opinions of the GAZETTE.

Heretofore your opposition to the system has been conducted cleverly and with fairness, but in this article there is an evident attempt to rob it of all its claims to consideration, which I am bound to attribute to the reasons assigned in the article itself—want of information regarding the weights and capacities of cars and cost of construction of narrow-gauge lines. The article certainly shows the want of such information, but I should have expected from the visits of one of your editors to the works where the cars for the Denver & Rio Grande Railway were being built that it might have been otherwise; besides that, photographs and descriptions of the four-wheeled freight-cars have been widely distributed. But, since you lack that information necessary for a fair discussion of any subject, I feel it is necessary, as far as time will permit me, to supply it, in order that you may be better guided in any future articles towards that fairness of comparison exacted from the advocates of the narrow or three-foot gauge.

You claim, and very justly, that all cars for the narrow gauge should only be compared in point of strength, weight, capacity and cost with corresponding cars for the broad gauge. As the great majority of the cars in use on American roads are eight-wheeled bogie-truck cars, I agree with you fully in thinking that all comparisons should be made with them. The accompanying drawing will give an illustration of the general plan of an eight-wheeled car for the 3-foot gauge—one of a set but just finished for the Denver & Rio Grande Railway. We solicit

16,000 lbs., while that of the platform having the same strength is placed at 19,000 lbs., for the reason that they deemed the box too small to hold more than that amount of general merchandise.

There are but very few articles, however, of general traffic of such bulk in proportion to their weight that they would fail to load the car to its full capacity of 17,600 lbs., as here given. One of these is cotton, which has an average weight in bale of about 15 lbs. per cubic foot.

With this freight the capacity of the car would be limited to 11,800 lbs. This is a proportion of dead to paying weight of 1 to 1.34, so that it would still have a great advantage over the broad gauge, even for this exceptionally light and bulky weight.

For roads where the traffic should be largely in cotton a much larger car could easily be built seven feet wide and weighing 9,000 or 9,500 lbs., which would still maintain the proportion of one dead to two paying weight.

For purposes of comparison I propose taking a Pennsylvania Railroad car built by same makers, the heaviest and strongest made for that road—a car having a varying weight of from 18,000 to 20,000 lbs., and capacity limited to 20,000 lbs. The floor is supported by seven stringers, the two outside 4x8 inches each, the five intermediate ones 3x7 inches each, with a clear span of 18 feet, trussed by three 4-inch rods passing under two 3x9 inch corbels supporting the stringers. The weight of this car loaded will average, say, 39,000 lbs.

The floor of the 3-foot car above, as will be seen, has but four stringers, the two outside being 4x8 inches each, the two intermediate 4x7 inches each, having clear span of fifteen feet and trussed with two 4-inch rods passing under two 3x9 inch corbels as above.

The box framing will compare favorably in point of strength with the heaviest cars for the broad gauge, and is 30 per cent. stronger than that of the great mass of cars in daily use.

A simple calculation will show the platform strength

To be compared with their peers on broad-gauge roads these cars should have—

1. Equal strength in proportion to the load to be carried. I submit that they have that equal to the best cars made.

2. That they shall have equal capacity for speed. To have this they must have equal strength of framing throughout to resist the jolting and strains. The drawing will show that they have this.

They should also have an equal angle of stability. As noted above, we have an angle empty of 56 degrees, loaded with wheat, 51 degrees. The usual angle of stability for a broad-gauge car is from 38 degrees to 45 degrees. Certainly they are at no disadvantage, in this respect.

The axle friction should be no greater than on the broad gauge. With 20-inch wheel and 2½-inch journal at 20 miles per hour the speed of the axle is 223 feet per minute. Most broad gauge cars have wheels of 30 inches diameter and journals of 3½ inches diameter. At 20 miles per hour their speed would be 205 feet per minute. If we substitute 24-inch wheels for the 20-inch wheel now used for the narrow-gauge cars, which can be done at the slightest possible increase of weight and still retain an angle of stability as great as the broad-gauge car, the speed of axle would be but 186 feet per minute.

A serious impediment to speed and deduction from power of engine is found in the flange friction and sliding of wheels on curves owing to difference in length of inner and outer rails. For the 3-foot gauge this is reduced about 30 per cent.—a most important advantage in lines having considerable curvature. I believe, then, that this point of speed may be readily conceded.

3. That the cost of cars shall be no greater for their tonnage. The average cost of the three classes of cars, box, gondola and platform, for the 3-foot gauge, is \$21.70 per 1,000 pounds capacity.

The average cost of corresponding cars for the broad

gauge (4ft. 8½ in.) is \$32 25 per 1,000 pounds capacity, or nearly 50 per cent. greater than for the 3-feet.

So it will be seen that in no point of comparison do these cars suffer, while in many which are vital to the transportation interest of the country they so far excel as to be beyond comparison.

The following comparative statement will show these things more plainly:

STYLE OF CAR.	WEIGHT.		CAPACITY.		COST IN 1871.	
	Gauge 3ft.	Gauge 4ft. 8½ in.	Gauge 3ft.	Gauge 4ft. 8½ in.	Gauge 3ft.	Gauge 4ft. 8½ in.
8-wheeled box.....	8,800	19,000	17,600	20,000	\$450	\$735
8-wheeled platform.....	6,250	18,000	19,000	20,000	350	575
8-wheeled gondola.....	7,250	18,500	18,000	20,000	385	625
Average.....	7,450	18,500	18,200	20,000	\$395	\$645

STYLE OF CAR.	COST PR. 1,000 LBS. LOAD.		PROPORTION OF DEAD TO PAYING LOAD.	
	Gauge 3ft.	Gauge 4ft. 8½ in.	Gauge 3ft.	Gauge 4ft. 8½ in.
8-wheeled box.....	\$25 58	\$36 75	1 to 2	1 to 1.05
8-wheeled platform.....	18 42	27 75	1 to 3.04	1 to 1.11
8-wheeled gondola.....	21 38	31 25	1 to 2.48	1 to 1.08
Average.....	\$21 70	\$32 25	1 to 2.45	1 to 1.12

Saving in dead weight of cars to carry 100 tons freight..... 103,000 lbs.
 Saving in cost of cars to carry 100 tons freight..... \$3,110

Nearly a hundred of the four-wheeled cars are in daily use upon the Denver & Rio Grande Railway carrying iron and other construction material. To carry iron, as they are short cars, a swing bolster is placed across the center of the car and two are coupled together, the iron resting on the bolsters. Each car weighs 3,500 lbs., and carries 10,500 lbs. of iron (21,000 upon the two). It is the severest load with which any car can be tested, but it is carried with perfect ease, the cars running so steadily and smoothly over a new track, as yet unballasted, with heavy gradients and sharp curves, as to be a subject of remark by every one who sees them. Railway men especially remark the nearly perfect freedom from flange friction on curves, which would cause the cars upon the broad gauge to grind very badly. I should certainly like to see a train made up upon the broad gauge of any cars which would weigh so little and do so much as these, and a description of such would be of very great benefit.

Unfortunately for us, delays in the arrival of iron for the Denver & Rio Grande Railway (which is now, however, on hand) have prevented the completion of the line and delayed the experiments which were proposed to be made when the work of construction should be finished, which will account for the meagre information regarding the operation of this line.

It seems a little strange that, while crying out against unfair comparisons, you should yourselves have selected as an offset to the passenger cars built for us by Jackson & Sharp, such a car as the one mentioned in use on the New Jersey Railroad. Nowhere else could you have found a car so frail or devoid of ornamentation as the one you cite, which is in use only as a smoking car or second-class car on the local trains between New York and New Brunswick. I cannot recall in my journeys through the country anything fit to compare with them.

If disposed to deal fairly, why not cite our smoking car, which gives as much room as the New Jersey car, and weighs but 307 lbs. per passenger, and costs but \$58 per passenger; or, if not so magnanimous, make due allowance for the two water-closets, the partition in the center and stove space, which are wanting in the New Jersey car, and which allowance would give more room per passenger than the New Jersey car, while bringing weight and cost for this first-class handsome car below that of the poorest of broad-gauge rolling stock.

If we had chosen to run such cars as the one quoted, we could have built them for a weight of 320 lbs. per passenger, with the allowance of 33x19 inches space claimed for the New Jersey car; but every one who saw these cars for the Denver & Rio Grande Railway as they left the shop will admit that, in point of finish, they were worthy of comparison with the best day cars made.

It is a mistake which all opponents of the narrow gauge make to suppose that the lightness of these cars arises from a frailer style of construction than those in ordinary use which are so heavy; but that this is not so any one who takes the trouble to estimate the relative strength of the car framing given above, and that of any, even the heaviest, car in use on broad gauges, may readily see. I have not just now the data at hand, nor the time to make as full comparison of these cars with those of broad gauges as I would like. I would rather show side by side the weights and comparative strength of each detail of the two systems. Such a comparison would show more plainly than any explanation all the advantages afforded by the 3-feet gauge for car construction, and where the great saving in weight is obtained. The deductions to be drawn from the foregoing statement of weights and capacities, and from a thorough examination of the drawing, are:

First. That the strength of these cars, their capacity for resisting shock and strains, as compared with the best cars in use on the 4ft. 8½ in. gauge, is as 95 to 100.

Second. That their actual carrying capacity is in the same proportion.

Third. That their capabilities for speed are in same proportion.

Fourth. That with all these, the average weight of the three styles of cars given above on each system bears a proportion of but 39 for the narrow gauge to 100 for the broad, with a proportion of cost but 67 to 100.

Now, as it is from freight that new roads west of the Mississippi must chiefly look for support, I think we might well eliminate the passenger question from this

discussion; but, if you please, we will compare our passenger cars with such as are in use on the Pennsylvania Railroad, Pittsburgh, Fort Wayne & Chicago, Hannibal & St. Joseph, Kansas Pacific, and many other first-class roads. A car which has a weight of 36,000 to 38,000 lbs. costs \$6,000, and seats 53 passengers, giving them 19 inches width and 33 inches between seats. This is a weight, per passenger, of 675 lbs. and a cost of \$113. To give the passengers on the Denver & Rio Grande Railway the same room, we should take out the partition, reduce number of passengers to 32, and have a car weight of 468 lbs. and cost of \$100 per passenger. The height of the cars is already much greater than those on foreign roads, and is sufficient to allow perfect freedom of movement for the tallest persons. The ventilation is also as perfect as in any cars in use. After witnessing the results obtained on these, the first of the kind ever built, I have no hesitation in saying that all the comforts desirable for passengers on the longest routes can be obtained in the narrow-gauge cars, without exceeding, even if equaling, the weight and cost of the broad-gauge cars.

These questions have been discussed so long that I believe it is evident to all that four-fifths of the roads already constructed in the United States are operated with rolling stock having its weight so disproportioned to the amount of traffic that the expense of constructing lines for it to run upon, and the subsequent heavy expense of operation involved by its use, is a waste of money almost criminal in those parts of our country yet unsupplied with railways, where capital as well as traffic is small, and where it can always find so many more profitable uses than that of being sunk in the construction of lines where the very excess of capital employed must defeat the objects for which the line was built, retarding instead of accelerating the development of the country.

One plan by which to remedy this has at one time or another been a favorite one with probably nearly every engineer in Christendom. They have all said: "Of course rolling stock is too heavy. Build it lighter and lighter lines can be made upon which to run it, which will be paying railways even with the smallest traffic;" and such lines have been constructed, retaining the existing gauges, under the natural belief that transfers were to be avoided, but disappointment has resulted in almost every case, whether in Europe or this country, because the light rolling stock when transferred to other lines would not stand the heavy shocks and strains on the heavier roads, and the lightly built lines would not support the heavy pounding weights of the heavier rolling stock, so that the lines very soon lapsed to the old system. The tendency has constantly been toward heavier rolling stock, though their loads have not been correspondingly increased, and just so long as roads are built wide enough to permit such disproportions of car weight and freight as now exist, just so long will these disproportions increase, and lines must be constructed heavy enough to support them.

But even were it possible to restrain this tendency toward increase of weight on present gauges, it has not by any means been proved that it would be the best for the new system which must be developed in the unoccupied countries west of the Mississippi.

The history of the narrow gauge and its advantages has been too often discussed to need any repetition. It has furnished a solution for nearly all the difficulties with which engineers had to contend in the building of light railways, and its advantages have become so apparent in its long trial abroad as to threaten to revolutionize the whole system of railroads, instead of being, as its first advocates claimed, adapted to the wants of particular sections and districts. No better proof of its merits could be found than in the opposition it meets among those fearing rival roads. To counteract its increasing popularity the old principle of light construction on broad gauges is revived. The surprising part of this is, that it should meet with support from the GAZETTE.

Compared with the 3ft. gauge, the points claimed for this revised theory are, as near as I can gather:

Nearly equal economy in construction of line.

The same advantages of light rolling stock.

The avoidance of transfers.

Greater angles of stability and consequently greater steadiness for its cars.

In support of this theory you give in your issue of August 23 a comparative estimate of the cost of a road upon this plan and one of 3ft. gauge.

I will confess that in an examination of this estimate one can hardly believe it to be the work of a sound or experienced engineer, and is naturally puzzled to know how it could have passed into your columns without more careful criticism. A still more surprising thing is that you should have soberly commended it and that the *Scientific American* should, in reproducing it, be so overcome by its plausibility as to forget its usual caution and strike out savagely in regard to what it terms "a narrow-gauge bubble." Now while the article in the *Scientific American*, which is justly headed "nonsense," is simply amusing in its absurd decisions as to what will be the effect of this estimate, it is no less intended to do the narrow-gauge interests much harm.

It certainly has not been shown, nor do I think it can be, that "many of the items set down" in that estimate "as equal in cost" will be the same in both cases.

For instance, the item of graduation, in which but 6 per cent. difference in cost between that necessary for 4ft. 8½ in. and that for three feet is shown.

I should very much like to see the country where an engineer could construct a safe road bed for a 4ft. 8½ in. track at a cost of but 6 per cent. greater than one which would be perfectly secure and most economical for a gauge of 3 feet. The nearest approach to it would be, perhaps, on some parts of the great plains in the far West, where the cost of one being little or nothing, the increase for the other would be expressed in same terms. But if we take that extreme, take the other also. I know of many miles of country through which railways already projected and building must pass, in the mountains of Colorado and New Mexico and through the elevated table lands of Arizona, where the increase of cost would be more than 50 per cent., and in some cases more than 75 per cent., over that for a 3-feet gauge, without making

any allowance for the sharper curvature permissible on the 3-feet, and which the desirable feature in the broad system, the avoidance of transfers by running over the line the heavy rolling-stock of other roads, would prevent. Miles of country nearly as bad exist in Pennsylvania, Virginia, Tennessee, South Carolina, Georgia and other States, which in the near future must be traversed by railways under the increasing demand for cheap transportation, where the difference in cost of graduation will range from 25 to 30 per cent., allowing the cheapest possible construction for the broad system.

The item of masonry is also set down as equal in cost for both gauges.

That should certainly have required a little explanation. Is it possible to build a culvert through or under a broad bank at no greater cost than through or under a narrow one? Or, since always it is contemplated to run over this line the wider and heavier rolling-stock of other roads, would an engineer build any piers for bridges as narrow as those for a 3-feet gauge, where no such transfer is contemplated? Or would the bridges themselves be made no wider or heavier than for the 3-feet gauge where no heavy rolling-stock is proposed to be run upon the line?

Some regard for another apparently desirable feature of these light roads—the gradual adoption of heavy rolling stock—would, I think, also demand that engine-houses, machine and car-shops, &c., being permanent structures, should be made large enough to accommodate the future engine and car. None of these things enter this estimate, which is so full of such omissions and inaccuracies that any further criticism of it would be wasted time. Suppose we allow that it is possible for the estimate to be correct (which certainly is a great moral concession) and that on this light railway the same small tunnels, narrow bridges, light rails, etc., are used; such at least as would be perfectly secure for the 3-feet gauge. It is claimed that the only difference in weight and cost of rolling stock would be that arising from increased weight and cost of axles. In other words, all the stock adapted to and built for the 3-feet gauge would be used on this broad gauge; that is, they would retain one of the greatest disadvantages of the old system—the long axles, with their heavy dragging around curves, greatly detracting from the power of engine, and combine with it, what they have all along maintained to be the disadvantage of the narrow gauge, the narrow car-body. And for what purpose? Simply that they may have a greater angle of stability for their cars, and that their rails may be far enough apart to avoid the necessity of transfers by running over their line the loaded cars coming to them from other lines.

It would not be reasonable to suppose that with the small wheels of the narrow gauge many of their own cars would find their way on other lines; therefore, the bulk of the traffic must still be transferred, even after this sacrifice to prevent it, or else the large wheels and heavy truck-frames of the large car must be adopted at a considerable increase of weight and cost, for which in the estimate no provision is made. As to angles of stability, since it is commonly assumed and practiced that 38 degrees to 45 degrees is perfectly safe at any ordinary speed, and it is shown that the 3-feet gauge possesses 45 degrees to 50 degrees loaded and 55 degrees to 90 degrees empty, I can hardly understand why any great sacrifices should be made to obtain a greater. Truly, then, the great advantages to be derived from this broad-gauge, lightly-equipped system are as stated, that one way transfers can be avoided. But how will the attempt to run an ordinary car over such a road affect it? Before it can be done the whole line must be rebuilt—tunnels and cuttings enlarged, piers rebuilt and bridges made wider. Where, then, does this estimate of cost stand? Then a loaded freight car from a heavier line passes over this 30-lb. rail and hammers it with 5,000 lbs. per wheel, a force equal to that of the engine. A Pullman car is placed upon it and pounds it with 30 tons of dead weight. No engine from any other line may pass over it, or what is the result? Simply a bending of the rails to such an extent as to render it unsafe for use until the rails over the entire line are renewed. It cannot cross a bridge without inflicting an unsafe strain. Why, then, the bridges must be made heavier. The simple effect of all this is that in a short time the line has lapsed to the old system. All the advantages to be gained from the light rolling stock are lost, and the line has been rebuilt at a cost far exceeding what would have at first been necessary. The narrow gauge is at least safe from any such disasters as this, and will go on making equal speed, carrying as great a quantity of freight and doing it at a cost of two-thirds that for which its heavier rival can possibly carry it, and above all making dividends instead of assessments.

In making such an estimate as this, why is it that the cost of a representative line on the narrow gauge is overlooked? The GAZETTE says it declines to accept a casual newspaper paragraph regarding the cost of the Denver & Rio Grande Railway as reliable. I do not know what paragraph it refers to, but in a circular of June 25th I gave the comparative cost of two railways built under the same engineering supervision and having in all respects a similar plan of constructions through the same character of country (that through which the narrow gauge runs being, if anything, the most difficult), and having the same curvature and nearly equal gradients. The cost of the one on the 4ft. 8½ in. gauge, viz., the Denver extension of the Kansas Pacific Railway, being \$23,500 per mile, and that on the 3-feet gauge, the Denver & Rio Grande Railway, being \$13,500 per mile, including equipment.

Having occupied somewhat responsible positions in the construction of both these railways, with full knowledge of their details, I think these figures at least may be accepted as reliable.

The trains of the Denver & Rio Grande are every day making as good speeds as are made on the average of Western roads, freight trains running at 10 to 15 miles per hour, while passenger trains have repeatedly been run at speeds of 28 to 35 miles per hour, with as certain safety and ease as were ever insured to the trains on broader gauges.

The difference between the two systems, viz., narrow gauge and broad gauge, with light equipment, is that

while both have started with equally favorable auspices, one has been tried and abandoned, the other, the narrow-gauge, inaugurated in Norway (after a thorough trial and abandonment of the light equipment for the broad gauges), has since progressed in favor steadily until the present time.

To-day we have on record the organizations of some forty-five lines of railway in the United States alone with 3-foot gauge, aggregating 10,000 miles in length and backed by some of the best railway men of the country, on nearly every one of which work has been commenced and is being prosecuted rapidly.

A singular feature of the argument of the broad-gauge light railway advocates is that they persist in denominating the narrow gauge a theory, while claiming for their own views the merits of practical success. It is a transmutation of terms that would be amusing were it not perpetrated by parties whose every word on such subjects should have weight.

The narrow gauge has been tried and operated successfully too long to be called a theory now. Its merit is its practical success wherever tried; whether for general traffic in Norway, Russia, Tasmania and Wales, or for purely mineral traffic—the hauling of slag from furnaces and coal from mines in this country, and, so far as tried, for general traffic on the Denver & Rio Grande Railway, the first in the United States.

The light equipment for broad gauges was tried in Norway. Failing in that, they found success in the narrow gauge. Light equipment for light broad roads has been used in England for branch lines and found wanting; it has been tried repeatedly in this country, and abandoned under the universal tendency to increased weight and strength in all classes of rolling stock. Which, then, is theory, and which has the practical value?

The narrow gauge starts with its rolling stock as strong in proportion as the heaviest of the broad gauge, and its gauge saves it from any tendency toward further increase of weight.

In face of all this and of the hearty indorsement of the 3-foot gauge by such eminent engineers and railway managers as John Edgar Thomson, Samuel M. Felton, Thomas A. Scott and a host more of the best and most thoroughly practical railway men of this country, whose names, on account of their present identification with broad gauge, I am not at liberty to quote, and in face of the reports of commissions appointed especially to consider its merits and composed of such men as those who sat on the Imperial Commission of Russia, and those of the India Commission, which decided on the metre (3ft. 3in.) as the gauge for a 10,000 mile system of railways in India, after a thorough trial of this broad-gauge, light-equipment system: even so good a paper as the *Scientific American*, in presenting the estimate from the *Gazette* of August 23, before spoken of, characterizes the narrow-gauge system of railways as a "bubble" and predicts its speedy collapse. Now I have no claim to sit in judgment upon the editor of that paper, but I certainly must be permitted to doubt as to his being a man of sounder judgment or more practical experience in railway construction, or more reliable on general railway matters, than thousands of the men whose opinion is directly opposed to his, indorsing the narrow gauge as emphatically as he condemns it; and, in a modest way, I would beg to suggest to him than in presenting and indorsing such an estimate as the one given, where the only difference he could see in cost of rolling stock was to be in the cost of axles to the extent of 9 lbs. per car, he should not accompany it with the statement that the public will demand wide cars, for wide cars do most certainly involve more weight and cost in proportion to capacity, beyond that for a narrow gauge, than that included in the item axles, and just as certainly do they involve an increased size and cost of bridges and masonry, of cuttings and tunnels, of engine houses and shops, unprovided for in the estimate; and I would also ask him as well as the *Gazette*, since both papers from their able management and wide circulation have great influence in forming the opinions of a large portion of the people of the United States upon such subjects, if it would not be better to wait until the roads now approaching completion in this country shall have demonstrated the truth or falsity of their claims by practical operation, before deciding so summarily what the people will demand; and that they may investigate the capabilities of the narrow gauge for comfort more thoroughly than either appears yet to have done, before deciding that the people will demand any more than they can easily obtain on the 3-foot gauge.

It certainly at this late hour did not need a prophet like the *Scientific American* to divine that light railways for light traffic would probably be the next phase of railroad engineering, but it did require considerable assurance to proclaim so decidedly that it was not to take the shape of narrow gauges.

Long ago the people demanded cheaper transportation, and were given as the change to be desired the kind of light line you now propose. It was a partial remedy, however, too weak to hold its own. We have progressed since then and have discovered the cause of failure.

Now when the demand is repeated more loudly than ever, engineers are ready with a nearly perfect system, which merits something more than the caustic commentary "bubble." A system which promises to double the facilities and halve the cost of transportation. Surely it were wiser to give the widest encouragement to such plans, instead of answering the cry with a resurrected failure; to gain more credit for reliability, to become safer guides for the masses by a thorough investigation of the merits of plans already so strongly supported, instead of ruthlessly condemning them in face of established facts.

HOWARD SCHUYLER.

—The German railroad companies are talking about adopting compartment cars with sleeping-berths for passengers, and as an experiment it is agreed that they shall be introduced for the convenience of the through traffic from Vienna to Paris and Vienna to Strasburg, respectively; but only for first-class passengers and on payment of an addition of 25 per cent. on the present rate of fares.

THE AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.

Official Report of the Fourth Annual Convention, Held in Louisville, Ky., September 12, 13 and 14, 1871.

[CONTINUED FROM PAGE 352.]

On reassembling, the report of the Committee on style of Engines for Freight Service was read by the Secretary:

REPORT ON LOCOMOTIVES FOR FREIGHT SERVICE.

To the American Railway Master Mechanics' Association:

GENTLEMEN: Your Committee, to whom was referred the question, "What are the Best Patterns of Locomotives for Freight Service?" beg leave to report as follows:

The question is one that involves so many side issues, and depends to so great an extent on the circumstances of each case, that your Committee feel that it would be presumption in them to designate any one particular style of engine as best adapted to all conditions of freight service.

Experience has shown the necessity of dividing such service into *fast and slow, light and heavy*. Fast and light freight trains are required for the transportation of rapidly perishing merchandise, such as ice, fruits, live stock, and also for transportation of fine articles of great value, such as silks, which require to reach their destination promptly, to find immediate sale and avoid changes in the market value. In cases of this character, dispatch is of the first consequence and expense a secondary consideration, and freight trains are run at a rate of speed varying from eighteen to twenty-five miles an hour.

Another class of goods may be designated as *slow freight*. Here economy in cost of transportation is the first consideration, and time is of secondary importance. Such merchandise as coal, lumber, ores, iron, grain, lime, etc., are included under this head.

Other circumstances attending the solution of the problem are the grades of the road, the character of the traffic ruling on the same, etc., etc.

Your Committee, therefore, having full faith in the combined wisdom of our railroad managers, and accepting the old adage, "Straws show which way the wind blows," believe that it is only necessary to look at what has come into use on the different roads under the circumstances of each case.

On comparatively level roads, such as prevail in many of the Western States, it will be found that the eight-wheel engine, with two pairs of drivers, is generally used as well for freight as for passenger service. For fast freight in the mountainous States, the same type of engine prevails. In Pennsylvania, Maryland and Virginia, and elsewhere, however, grades of from fifty to one hundred feet per mile are to be worked, and freight, consisting for the most part of coal, iron ores, lumber, oils, pig and bar iron, etc., and other articles in the transportation of which low rates are the desideratum, are to be hauled, it will be found that the eight and ten-wheeled engines having three and four pairs of coupled wheels, and weighing from 65,000 to 90,000 pounds, in running order, are mostly used. With engines of this character, very heavy trains are moved at a speed of from eight to twelve miles per hour. The precise plan of these six-coupled engines is in turn determined largely by sectional preferences. Thus, on some of the railroads in New York and Northern New Jersey, heavy freight locomotives, having three pairs of drivers, with a driving-wheel base of 14 or 15 feet and one pair of pony or leading wheels, are most in favor. While in Pennsylvania, Virginia and to some extent in Indiana, and elsewhere, the ten-wheeled engine, having three pairs of drivers and a four-wheeled truck, is preferred for heavy freights. On the steepest grades, however, such as those on the road of the Mt. Savage Iron Company, of Maryland, the Lehigh Valley, Lehigh & Susquehanna and Philadelphia & Erie railroads, those known as the "consolidation pattern," having four pairs of drivers and a pair of pony-wheels, are considered the most economical and efficient. The loads hauled by engines of this class are so great that the cost of transportation can be reduced to the lowest possible figure. Although these engines in running order weigh about 90,000 pounds, they are easy on the rail, work smoothly, and pass curves of 200 and 300 feet radius with ease. In fact, it is claimed for them by the managers that, by reason of their peculiar plan and arrangement, they are superior for slow freight service, on such roads as have been named, to all other patterns in use.

Your Committee accordingly conclude, and beg leave to submit, that for fast freight the ordinary eight-wheeled engine with four drivers is most suitable; for ordinary freight service the ten-wheeled engine with six drivers, and for working heavy grades and moving maximum quantities of freight at slow speed the "Mogul" engine with six drivers and pony truck, or the "Consolidation" pattern, with eight drivers and pony truck.

D. O. SHAVER,
S. M. CUMMINGS,
D. P. RENNIE,
ISAAC DRIPPER,
ALEX. MITCHELL,

Committee.

On motion, the report was received and ordered to be spread upon the minutes.

Mr. Jordan, Cumberland & Pennsylvania Railroad—Our grade runs as high as one hundred and seventy feet, and we find these engines most serviceable. We haul thirty cars up this grade. We find less wear on the track and less repairs to the engine. I think they are the best heavy freight engines we have ever had.

Mr. Wiggins, Boston, Hartford & Erie Railroad—I would like to inquire the size of cylinder and amount of steam carried.

Mr. Jordan, Cumberland & Pennsylvania Railroad—Twenty inches, twenty-four inch stroke, and one hundred and twenty pounds of steam, and a forty-eight inch wheel.

Mr. Lamb, Des Moines Valley Railroad—Were they loaded or empty cars?

Mr. Jordan, Cumberland & Pennsylvania Railroad—Empty.

Mr. Garfield, Boston & Maine Railroad—What rate of speed?

Mr. Jordan, Cumberland & Pennsylvania Railroad—Ten miles an hour.

Mr. Setchell, Little Miami Railroad—How many loaded cars can an engine of that kind pull up a grade of 170 feet?

Mr. Jordan—We do not load the cars that go up the grade. They are pulled up to the mines empty to be loaded.

Mr. Wells, Jeffersonville, Madison & Indianapolis Railroad—We have on the Madison Branch of our road a grade of 320 feet. Formerly we had a cast-iron track and cogs between the tracks. That arrangement has been dispensed with, and we now use a weighted engine to obtain adhesion. It is 20 by 24 with a driving-wheel of 43 inches. We find no difficulty in obtaining all the adhesion necessary to prevent the wheels from slipping. We are able to draw up that grade 16 empty cars; or 6 loaded cars of ten tons each, making twenty tons to the car, with 120 pounds of steam. This is a grade of one foot in 164. They run with less expense than before. The speed upon that grade is, of course, slow, not more than six or eight miles an hour. Our passenger trains go up at the rate of eight or ten miles an hour. The length of the grade is one mile and a third. When the speed is slow there is no doubt that engines of that kind are the best for drawing heavy loads. Of course, in going at the rate of fifteen or twenty miles an hour, the wear and tear would be more to those engines than those of a different style.

REPORT ON SPEED INDICATORS.

The report of the Committee on the Practicability of Placing Speed Indicators on Engines was then presented, together

with a descriptive pamphlet. The report was then read by the Secretary.

To the American Railway Master Mechanics' Association:

GENTLEMEN: Your Committee, appointed at the last annual meeting of the Association on the "Practicability of Placing Speed Indicators upon Engines," beg leave to report that circulars were issued containing the following questions:

1st. Is it, in your opinion, advisable to place speed indicators on locomotive engines?

2d. Have you any such instrument in use? If so, please give particulars of its construction, if satisfactory; and if not satisfactory, please state what objections you find to it?

3d. If you have any information on the subject not embraced in the foregoing interrogatories will you please send it?

To which they have received answers from twenty-six master mechanics.

To the first question thirteen answer, no; five answer, yes.

To the second question eighteen have none in use.

To the third question nineteen have no information.

Mr. Boon, of the Pittsburgh, Fort Wayne & Chicago Railroad, replies as follows:

"In my opinion it would be advisable to place speed indicators on locomotive engines; provided the indicator was made to register the speed, that could be read off, showing the speed at any point on the road, and one that could not be tampered with by the engineer.

"I am satisfied that nearly all the accidents to freight trains while in motion are caused by excessive speed. Under no circumstances should a freight train run to exceed ten or fifteen miles per hour. You will find wherever a higher rate of speed is made with a freight train that wrecks are an every-day occurrence.

"On many roads rules are made to prevent fast running with freight; yet in spite of men being discharged for violation of rules, and every endeavor made to prevent them, they will continue to do so, and in many cases it is impossible to detect them.

"For these reasons indicators would pay any railroad to have them on their engines.

"Indicators for giving the speed the engine was making without a registering arrangement would be of but little use.

"All well-managed roads have their track carefully measured and marked, and with the time-card correct there is no trouble in knowing the speed locomotives are making.

"I have never seen or heard of an instrument of the kind."

Mr. Charles Graham, of the Lackawanna & Bloomsburg Railroad Company, thinks the Committee have mistaken the object of the inquiry.

He thinks the question should have been *distance* not *speed* indicators.

"We used a Shaffer & Budenburg indicator on one of our engines to ascertain the mileage, also to measure the length of our road, with distance between stations. We found the measurement as correct as the usual method with the chain, and therefore think it advisable to use them on all engines, to obtain the correct mileage, which, in my opinion, is a great desideratum."

Mr. J. B. Pendleton, of the Seaboard & Roanoke Railroad, reports as follows:

First Answer.—It would tend to correct irregular and reckless running to have an instrument that would furnish an indicator card of each trip.

Something of the sort, simple and durable, would no doubt assist in the economical management of an engine.

Second Answer.—Have no such instrument.

Third Answer.—Have no information on the subject.

Mr. J. H. Setchell, of the Little Miami Railroad, reports as follows:

"In my opinion the practicability of placing indicators on locomotives depends on the cost of such a device. It is a very desirable thing for a master mechanic to know how much slipping an engine does when tires come in badly worn. An indicator would enable him to place the blame where it properly belonged; for there is no doubt that tires and engines are many times badly damaged by the careless handling of the engineers; but if the indicator would be much additional expense in equipping engines, master mechanics would no doubt prefer to ascertain these facts by a comparison of one engine with another, or the tires of one engine with those of another.

"Again, it would be useful in ascertaining the regularity and speed of trains, and the ability of an engine of a certain class and size to make a uniform specified time all over the road. For instance, the running time of an express train is thirty miles per hour over the entire length of a hundred miles of road. If the engine does this as shown by indicator, it would be a fair estimate of its capacity; but if, instead, the indicator should show that the speed of the engine had been as high as sixty miles per hour, it would be fair to infer that the engine could not make the time on all parts of the road, or that the engineer was careless in running his train.

"It would be useful in case of accidents in deciding the speed of the train, as you will always find persons ready to swear in such cases 'that the train was running sixty miles an hour.' It was recently stated in my hearing in the City Council of Cincinnati that trains were run through the streets at this fearful speed, and I could not help remarking to a member that I found it hard work to run trains at half that speed out on the road.

"The device for the purpose of indicating speed must be simple and cheap, or the master mechanic will be satisfied with his bad-worn tires and the superintendent with his irregular trains."

Mr. Wm. H. Griggs, of the New York & Oswego Midland Railroad, reports as follows:

"I think it would be a good instrument to have on locomotives, noting revolutions of engine speed, etc. We would know more fully the miles the engine runs, beside noting if there has been much slipping of wheels, more particularly freight trains. It would give more accurate amount of switching done at stations.

"I have no such instrument. I have seen models of such an instrument got up by my foreman, Mr. O. Haynes, who is now Master Mechanic of the St. Louis & Iron Mountain Railroad.

"His machine was very simple. It was arranged, in connection with a clock, to register on paper the same as registering telegraph instruments. It made one prick on the paper to every nine revolutions of drivers, and was driven by eccentric, etc., from back shaft.

"Mr. Haynes had the model made and attached to a small clock, such as seen on locomotives. In my opinion it would be a valuable and reliable instrument. He had just perfected his model at the time he left this company."

Mr. S. J. Hayes, of the Illinois Central Railroad Company, reports as follows:

1st. "I should not deem it advisable to place speed indicators on all our locomotives, but think it would be desirable to have two or three of these instruments on each division of our road so arranged as to be easily changed from one engine to another.

"They could be used under the direction of several master mechanics, and would be very valuable.

2d. We have no such instrument on this road.

3d. I have never used a speed indicator, and have no information on this subject that would be of value."

Mr. H. A. Towne, of the Hannibal & St. Joseph Railroad Company, reports as follows:

"It is, in my opinion, not only advisable but important to place speed indicators on all freight and passenger engines, providing they can be made practicable and within a reasonable cost.

"We have no such instrument in use.
"If an instrument can be constructed so as to indicate the hour and number of revolutions (or distance) made within a given time, and placed beyond the reach of engineers or others who might tamper with them, it would be very valuable to the owners of railway property."

Mr. F. A. Perry, of the Cheshire & Ashuelot Railroad, reports as follows:

"1st. I do not think it advisable.
"2d. We have no such instrument at this time, but have had, and had it taken off, as we derived no benefit from its use."

"It was patented by a Mr. Billings, formerly Master Car Builder of the Rutland & Burlington Railroad, who is now, or has been until very recently, Master Car Builder of the Philadelphia & Baltimore Railroad."

The Committee beg leave to call your attention to a railway speed indicator and register, patented November 16, 1858, by Charles T. Siernur. See pamphlet, which contains a description of the invention.

Your committee have no other information as to its practical success than that which it contains.

Respectfully submitted,

WM. S. HUDSON,
Rogers Locomotive Works,
EDWARD H. WILLIAMS,
Baldwin Locomotive Works,
H. L. LEACH,
Hinkley & Williams
Locomotive Works,

Committee.

On motion, the report was received and ordered to be spread upon the minutes.

Mr. Towne, Hannibal & St. Joseph Railroad, moved the selected portions of the accompanying pamphlet be appended to the report. Rejected.

INVITATIONS.

Mr. Lauder, of the Committee on Invitations, moved a reconsideration of the resolution accepting the invitation of Mr. Thatcher Perkins, Louisville & Nashville Railroad, to visit Mammoth Cave, on account of the time necessary to make the trip. Carried.

Mr. Setchell, Little Miami Railroad, moved that the communication of Mr. Perkins be received and filed, and the Secretary be requested to inform Mr. Perkins that the Association was compelled, for want of time, to decline the invitation. Adopted.

Mr. Sellers thought it best to take the sense of the convention.

Mr. Wells, Jeffersonville, Madison & Indianapolis Railroad—This will not prevent anybody from going who desires to do so. Passes would be furnished them, and they would receive the same courtesy as individuals that would be extended the Association as a body.

Mr. Burke, Memphis & Charleston Railroad—I would suggest that the names of persons desiring to go be furnished the Secretary.

REPORT ON COMPRESSION BRAKES.

The report of the Committee on the application of Compression Brakes was then presented and read by the Secretary:

To the American Railway Master Mechanics' Association:

GENTLEMEN: The Committee, to whom the subject of "Application of Compressed Brakes" was referred at your last meeting, beg leave to submit the following report:

We have received communications from twenty-seven master mechanics, all agreeing that it is practical to put the entire control of the train in the hands of the engineer.

But few of the master mechanics have given the different devices a trial, so that only two are prepared to speak from experience, and those two have the "Westinghouse Air Brake," and speak favorably of it.

Your Committee have investigated the workings of the "Westinghouse air brake," and consider it practical in all the details, and have no hesitation in recommending it to railroad companies as being a safe and reliable brake.

Respectfully submitted,

A. MITCHELL, Lehigh Valley Railroad,
D. O. SHAVER, Pennsylvania Railroad,
C. T. HAM, New York Central Railroad,

Committee.

On motion, the report was received and ordered to be spread on the minutes.

Mr. Burke moved that as most of the members of the Association had read a description of the "Westinghouse Brake," that the reading of the accompanying description be dispensed with. Adopted.

CHANGING TIME OF CONVENTION.

The report of the committee on change of time for holding the Convention was then made by Mr. Johann, as follows:

A majority of the committee are in favor of changing the time from September to an earlier period, say May or June.

Report received and committee discharged.

Mr. Wells, Jeffersonville, Madison & Indianapolis Railroad—Mr. President, in order to get this matter before the meeting, I move that the change be made to the second Tuesday in May.

The President announced that it would be necessary to amend the by-laws, for section 5 Article I. reads as follows:

ARTICLE I.

SECTION 5. The regular meeting of the Association shall be held annually on the second Tuesday in September.

Mr. Wells, Jeffersonville, Madison & Indianapolis Railroad—I move that the article be amended to read the second Tuesday in May.

Mr. Setchell, Little Miami Railroad, called for a rising vote. Adopted unanimously.

Mr. Devine, Wilmington & Weldon Railroad—I move that the election of officers be postponed till the next annual meeting.

Mr. Setchell called for a rising vote. Adopted.

Mr. Van Tuyl, Cincinnati & Indianapolis Junction Railroad—I move that all persons who have withdrawn from the Association for the purpose of engaging in other business be declared honorary members of this body.

Adopted.
[Note.—This was subsequently repealed, and the following adopted—Secretary.]

Mr. Palmer, Pittsburgh, Cincinnati & St. Louis Railway, presented the following resolutions:

WHEREAS, The experience of the Association shows that it is only by continued and united efforts that the object of the organization may be obtained; and whereas, by the Constitution and by-laws as at present existing, we are deprived of the aid and co-operation of members who may be transferred to other spheres of action than those immediately connected with railway management; be it therefore

Resolved, That any person who has been or may be duly qualified, and signs or causes to be signed the Constitution, as member of the Association, remain as such until his resignation may be voluntarily tendered; and be it further

Resolved, That the Association fully appreciate the value and importance to the railway interest of America of the plan of this Association as originated at Dayton, Ohio, June 10, 1868, by H. M. Britton, W. F. Smith, O. H. P. Little, Frederick Grinnell, William Swanton and Reuben Wells, and that the Secretary be instructed to cause this resolution to be handsomely engrossed, and a copy sent to each gentleman named in the resolution; and be it further

Resolved, That the Secretary be instructed to notify all former

[*Note.—A detailed description of the Westinghouse Brake, but not a part of Committee's report.—SECRETARY.]

members who may be debarred by the by-laws as herewith existing, from participation in our meeting, of this change, and request their future attendance.

Adopted.

The President presented a communication from Mr. Pearsall, foreman of the Marietta & Cincinnati Railroad boiler shops, which was referred to the Committee on Boilers and Boiler Materials.

Mr. Shaver, Pennsylvania Railroad—Mr. President, as we have adopted a resolution making certain persons honorary members of this Association, I move that the Secretary be requested to notify them by letter of such action.

Mr. Hayes, Illinois Central Railroad—I would like to inquire, Mr. President, whether an honorary member can be an officer of this Association. It seems to me that they must be members in the service specified, but I am not clear upon that point and would like to be enlightened.

President—I would suggest that an honorary member should not hold office, and think it would be proper to tender my resignation.

Mr. Setchell, Little Miami Railroad—Mr. President, I move a reconsideration of the vote. [Pleasantry.] The intention was to compliment the founders of the Association. Railway companies sometimes compliment master mechanics by retiring them; but that is not the intention of our compliment. [Laughter.]

Mr. Hayes, Illinois Central Railroad—I have belonged to different associations all my life, and am now fifty-four years of age. In all cases honorary members have no vote and pay no dues. That is the rule of every society I have belonged to. Now, is that your intention? There are reasons why we should have an election, not that I want to get rid of any officer here. Nobody wants to get rid of our President or Vice-President, but I want to get rid of the Treasurer. [Laughter.] I think it is necessary to reconsider the vote, and let gentlemen express their views. I think if that matter is reconsidered, as Mr. Setchell has moved, it will be entirely changed. Of course, if it is not reconsidered, I shall resign. I do hope it will be, and that these gentlemen will be re-elected till next May.

Mr. Setchell's motion was then adopted.
Mr. Grant, Rockford, Rock Island & St. Louis Railroad, moved that the same individuals be made active life members of the Association entitled to franchise.

Mr. Setchell, Little Miami Railroad—That amounts to the same thing, and I move to lay it on the table. Adopted.

The report of the Committee on the Relative Merits of Steel and Case-hardened Iron for Working Parts of Locomotive Engines was then presented and read by the Secretary.

To the American Railway Master Mechanics' Association:

GENTLEMEN: The Committee, appointed at your last annual convention to report upon the relative merits of steel or case-hardened iron for working parts of locomotive engines, respectfully submit the following:

We have communications from thirty-two master mechanics, twenty-nine of which favor wrought iron case-hardened, the remaining three prefer steel for guide bar and crank pins.

We, the Committee, do not hesitate to say that good hammered iron, well case-hardened, is much better than steel.

One objection to case-hardened iron which many have is on account of the trouble of getting the work in shape after being case-hardened.

With the proper tools—such as a portable screw-press, etc., and a good man—the work is handled quickly, and that objection removed.

The New York Central Railroad Company have engines with 16x24 cylinder, 5 feet 6 inches drivers, that have the entire valve motion, including rocker shaft, guide bar and crank pin, made of wrought iron (case-hardened), which have run over five years without having the lost motion taken up.

C. T. HAM,
New York Central Railroad,
J. B. GREGG,
Erie Railway,
W. M. STRONG,
New York & Harlem Railroad,

Committee.

On motion, the report was received and ordered placed on record.

Mr. Burke, Memphis & Charleston Railroad—I move, Mr. President, that the Chair now appoint a committee of five to draft subjects for report and discussion at our next meeting. Adopted.

The President then appointed the following Committee: Burke, Memphis & Charleston Railroad; Wells, Jeffersonville, Madison & Indianapolis Railroad; Boon, Pittsburgh, Fort Wayne & Chicago Railroad; Williams, Baldwin Locomotive Works; and Grant, Rockford, Rock Island & St. Louis Railroad.

Mr. L. H. Sellers, Memphis & Charleston Railroad, was subsequently placed on the Committee instead of Mr. Burke, at the request of that gentleman.

The report of the Committee on Steam Machine Riveting was then presented, read by the Secretary, and ordered to be placed upon the minutes.

REPORT ON STEAM MACHINE RIVETING.

To the American Railway Master Mechanics' Association:

GENTLEMEN: Your Committee on Steam Machine Riveting, having given the subject their fullest attention and consideration, find that there has been, and is still, considerable prejudice against the system in the minds of many of our ablest mechanics. This prejudice, it must be acknowledged, is not without good reason.

The first riveting machine of which we have any knowledge was constructed on what is known as the "Vogge plan." This machine had a positive motion, a fixed and uniform movement, arbitrary as to distance. It was, however, adjustable to the length of the rivet and thickness of plates to be used, so that in any variation of these it was necessary to overhaul and readjust the machine, thus involving time and trouble. The riveting was accomplished by a squeezing process.

With this machine good work could be done by a careful, intelligent and conscientious workman, but as boiler-makers do not possess these qualifications in any greater degree than workmen in any other department of business, the reputation of the work done by the machines so constructed has, in many instances, been such as to create a proper feeling of distrust against machine riveting; and as it is not possible always to obtain workmen who understand and appreciate the necessity of adjusting the machine at every change of rivet or thickness of sheets, much of the work will be badly made. For instance, if the rivet is too short the sheets will not be perfectly riveted, the hole will be only partially filled, and the head will not be drawn down firmly on the sheet. On the other hand, if the rivet be too long, the metal will be forced into the hole to such a degree as to stretch the plates, making the hole oval in the direction of the lap, and weakening, if not breaking, the sheets between the holes.

For these reasons machine riveting met with no favor in the minds of locomotive builders, and the work by machinery was generally distrusted. It is, however, a conviction almost universally accepted by mechanics at this day that work of a more uniform and superior character can and should be produced by machinery than by hand. Your Committee, therefore, feel that they would be recreant to their calling were they to allow this distrust of machine riveting to exist longer, considering the present advanced state of the mechanic arts. They cannot

observe any reason for making machine riveting an exception to this generally admitted fact.

Your Committee also find that hand riveting is not without its objections or difficulties in the certainty of producing good work. As an instance, it may be noticed that the violent hammering (amounting to one hundred and seventy-five blows per rivet) is liable to crystallize the rivet, as well as to affect the plates in a similar manner to a greater or less degree according to the nature of the iron used. Furthermore the rivets are required to be of strictly neutral iron, for if inclined to "cold-short" the heads are liable to fly off; if to "red-short" to split or gall while working at red heat. The liability of having ten to one hundred rivets of this character in a keg is not an unusual occurrence, and as they cannot be detected except in working there is a possibility of their escaping notice. Hence the character of the work is affected by the quality of the rivets. Again, in hand riveting so much depends upon the skill of the workmen as materially to affect the uniformity of the work; the results varying with the different ideas of the workmen.

Your Committee are of the opinion that the riveting machine now in use, known as the "piston machine," meets the requirements above mentioned.

1. The piston and rod form the ram, and being acted on by the steam at any given pressure the same force must be applied directed to each and every rivet driven, and with the same result.

2. As the piston is not limited in its movement it will follow the rivet home, drawing the plates well together, filling the holes and making the work equally good, whether the rivet is a half inch too long or a half inch too short; thus permitting what no ordinary workman would allow to occur, a difference of one inch in the length of the rivet driven in the same plate; the result being merely a disproportionately large or small head, which is a mere matter of taste, while the riveting would prove equally good and secure in either case.

3. As the riveting is done with a blow, and not by squeezing, the iron of the rivet is given no time to cool by contact with the sheet before it is forced into every crevice, and the hole compactly filled. The heading is done on the "capping" system, thus gathering the metal together instead of scattering it, as is the case with the hand hammer. The head, therefore, cannot split or gall, and consequently either "red-short" or "cold-short" iron can be used (red-short being preferred at all times). It thus becomes possible to prevent entirely the serious consequences arising from such a mixture of rivets as before mentioned, and which is so damaging in hand riveting.

4. Sections of the rivets driven by the piston machine show the hole to be well filled all around and not stretched to any appreciable extent (not more so than in hand riveting), while the rivet and plates are left soft and free from any crystallization.

Your Committee, therefore, in submitting the foregoing as the result of their investigation of the subject referred to them, beg leave to add that, in their opinion, "steam machine riveting," when properly performed by means of the piston machine, is superior to that done by hand.

All of which is respectfully submitted,

A. MITCHELL,
Lehigh Valley Railroad,
MORRIS SELLERS,
Late Des Moines Valley Railroad,
G. S. GRIGGS,
Worcester & Nashua Railroad,

Committee.

The President announced, by request of Mr. Wells, Jeffersonville, Madison & Indianapolis Railroad, that ample accommodation had been made for the friends of members of the Association desiring to go on the excursion to New Albany.

On motion of Mr. Williams, Baldwin Locomotive Works, the Association adjourned to meet Thursday morning, Sept. 14, at 9 o'clock.

THIRD DAY'S PROCEEDINGS.

The Association convened at 9 o'clock, President Britton in the chair.

President—The first business in order is the presentation of the report of the Committee on Lubricating Oils, which was read by the Secretary.

LUBRICATING OILS.

To the American Railway Master Mechanics' Association:

GENTLEMEN: In presenting their report upon the subject of lubricating material, your committee desire to state that they have confined themselves exclusively to the replies to questions in their circular, and as these only embrace the experience of twenty-seven different roads their report will not be as comprehensive as they could wish. The information obtained from these sources varies somewhat in details, probably owing more to local circumstances than to any individual merit of one oil as compared with another.

The general preference seems to be largely in favor of the use of lard oil mixed with a proportion of earth oil, of a gravity of 28 deg. or 29 deg. to keep it thin in winter. For fast passenger trains pure lard oil seems to afford the best results, while on slow freight trains heavy earth oils are equally successful, unless a journal should become overheated, when it is almost impossible to cool it with any of the different varieties of earth oils.

In lubricating cylinders, pure refined tallow, clear of acids, meets with most favor; although some prefer tallow oil in winter. Lard oil is also used to some extent for this purpose, securing complete immunity from dirt in pistons or on cylinder heads, and from the wasting of valve yokes, so often seen when tallow is exclusively used. A system of steam lubrication is also mentioned as being successful. A sufficient quantity of steam to lubricate the valves and cylinders, but not enough to accelerate the speed on descending grades. A little tallow is used with it, about one pound per one hundred miles. By use of this process brass rings are reported as wearing 4 inch in 44,652 miles running.

The use of plumbago, mixed with tallow, is highly recommended for cylinders, as giving them a smooth glazed surface, and is perhaps the best lubricant known for this purpose, as by its use the disastrous effects of acids in tallow are entirely avoided. There has heretofore been a difficulty experienced in procuring this material entirely free from foreign substances, especially quartz. But this objection to its use is obviated in the manufacture of chemically pure plumbago.

Plumbago grease for journals has not been extensively enough used to warrant as yet its general adoption, although parties using it heartily commend it as a journal lubricator of great value and a sure prevention of hot boxes. The manufacturers claim that it is infusible and practically indestructible, as neither a heat of 4,000 deg. nor a temperature of 50 deg. below zero, nor acid, nor gases, affects its condition. Experience proves that it forms on wearing surfaces a coating of extraordinary smoothness, and from its pasty condition is not liable to be thrown from the journal boxes, as are the oils ordinarily used for this purpose.

From the information received your committee consider the subject of decided importance, and recommend a thorough investigation as to the correctness of the merits claimed by those now using it. Reports from the Chicago & Northwestern Railway and Rome, Watertown & Ogdensburg Railroad, mention the use of cast-iron journal boxes in connection with this material, with most flattering results, the experiments extending through a period of about twelve months, and proving entirely successful. If these facts should be borne out by the experience of others in the same direction, the saving in the relative cost of iron and brass boxes would prove a very material item, and well worthy the consideration of railway managers. It is

hoped that further particulars upon this and kindred points may be brought out by the discussions at our annual meetings.

Your Committee would suggest that a number of the leading roads cause to be constructed for their use some device for testing the relative value of lubricants. Of those now in use the simplest form, perhaps, is that upon the Great Western Railway of Canada, consisting of a journal of the standard size running in our ordinary journal-box, packed in the usual manner, run at a uniform rate of speed under a pressure equivalent to ten tons to the car, a thermometer being attached thereto in such a manner as to note accurately the variations in the temperature. The information thus obtained would be entirely reliable, and the true value of the different grades of oil noted beyond possibility of doubt.

The entire subject appears to be well worthy of continued investigation, and if reports could be obtained from any considerable number of our railways they would prove in the highest degree interesting and instructive.

Hoping that the members may furnish verbal data from their experience, to be published in connection herewith, the matter is

Respectfully submitted,

M. BURKE,
Marietta & Cincinnati Railroad,
A. H. DE CLERCQ,
Toledo, Peoria & Warsaw Railway,
R. S. BUSHNELL,
Chicago & Northwestern Railway,

Committee.

On motion the report was received and ordered to be placed upon the minutes.

REPORT ON SAFETY VALVES.

The President then called for the report of the Committee on Safety Valves.

Mr. Setchell, Little Miami Railroad—The chairman of the Committee is not here to answer for himself, as I hoped he would be. I wrote to him during the year, but failed to elicit any reply. Yesterday he informed me that he did not intend to make any report. I am sorry to have to make such an apology to the Convention, but I see no help for it.

REPORT ON CYLINDER AND STUFFING-BOX PACKING.

The President—The report of the Committee on Cylinder and Stuffing-box Packing is next in order, which was read by the Secretary.

To the American Railway Master Mechanics' Association:

GENTLEMEN: Your Committee, to whom was referred the subject of "Cylinder and Stuffing-box Packing" at your last meeting, beg leave to report that in answer to the circular issued by them they received replies from only thirty-six masters of machinery, as follows:

J. H. Setchell, Little Miami Railroad; S. J. Hayes, Illinois Central; L. H. Sellars, Memphis & Charleston; C. T. Ham, New York Central; H. A. Towne, Hannibal & St. Joseph; George Richards, Boston & Providence; J. M. Foss, Vermont Central; G. H. Griggs, Worcester & Nashua; Sanford Keeler, Flint & Pere Marquette; J. N. Lauder, Northern (N. H.); C. B. Street, Pennsylvania; B. P. Freeman, Macon & Western; Thomas Connell, Buffalo, Corry & Pittsburgh; W. H. Griggs, New York & Oswego Midland; L. S. Young, Cleveland, Columbus, Cincinnati & Indianapolis; J. Van Veethen, Atlantic & Great Western; D. O. Shaver, Pennsylvania; Joseph Kelly, Providence & Worcester; A. S. Hull, Cumberland Valley; Thomas Denmead, Pittsburgh, Cincinnati & St. Louis; F. Roop, North Pennsylvania; Charles Graham, Lackawanna & Bloomsburg; E. A. Walker, Cape Cod; James Sedgley, Lake Shore & Michigan Southern; John McFarland, Richmond & Danville; John F. Devine, Wilmington & Weldon; M. Burke, Memphis & Charleston; J. W. Philbrick, Maine Central; A. H. DeClercq, Toledo, Peoria & Warsaw; J. Johann, Pacific of Missouri; J. Thompson, Eastern; F. A. Perry, Cheshire & Ashuelot; John S. Cook, Georgia; William Jackson, Rome, Watertown & Ogdensburg; J. M. Boon, Pittsburgh, Fort Wayne & Chicago; J. L. Kinsey, Lehigh Valley.

Of those who returned answers to your Committee, twenty-one were in favor of steam packing and fifteen in favor of spring packing.

The advocates for either style of packing gave many reasons for their preferences, based, doubtless, upon their experience with both, and, while the answers were generally clearly and emphatically expressed, none bore the appearance of being biased by prejudice.

It is claimed for steam packing that it can be more cheaply constructed, and after being first put in the cylinder requires no subsequent adjustment by the engineer; possesses less friction, and consequently exerts more power and wears longer. Highest mileage reported, 200,000 miles; lowest mileage, 15,000 miles.

Those who prefer spring cylinder packing admit a disadvantage in its first cost, but claim as an offset to that that its efficiency is so much greater than the steam packing as to make the difference of first cost a matter of no consideration. It is by them considered a more steam-tight piston, and less liable to blow; that it is not affected by the varying pressure of steam in the cylinder, and is less liable to wear the cylinder unequally. Highest mileage reported, 150,000; lowest mileage, 18,000.

Your Committee is of opinion that the chief merit of the steam packing consists of the absence of friction, when not under a pressure of steam, in descending long grades and upon approaching stations, and in the cheapness of the construction; that spring packing, while not absolutely without friction under the above circumstances, is nearly so when fitted with springs of proper elasticity, say sufficient to keep them in close contact with the cylinder without exerting undue pressure; and when cast-iron rings can be used results equally as satisfactory can be obtained.

They believe that both pistons are susceptible of improvements that would cause more economical and satisfactory results in their use; but with the information before them, received from the most experienced mechanics in the country, do not think the steam packing, as now used, so desirable as to cause the abandonment of the spring packing in its favor.

While tendering thanks to those who promptly responded to their circulars, the Committee regret that so many of the Association were unable to furnish them with their experience, and thus render their report more satisfactory and complete.

With regard to packing for stuffing-boxes, twelve favored the use of soapstone, twelve the use of hemp, and eight the use of soapstone and hemp combined. From four who favored the Committee with replies about cylinder packing, they received no response concerning their opinion of packing for stuffing-boxes.

Your Committee believe that the combined use of soapstone and hemp is productive of the best results—soapstone and hemp for cylinder and valve-stem stuffing boxes, and hemp alone for pumps.

Highest mileage, steam packing, Northern (N. H.) Railroad. Lowest mileage, steam packing, North Pennsylvania Railroad. Highest mileage, spring packing, Cumberland Valley Railroad.

Lowest mileage, spring packing, North Pennsylvania Railroad. Respectfully submitted,

DAN. W. HAINES,
Northeastern Railroad,
JAMES T. ROBINETT,
Atlantic, Mississippi & Ohio Railroad,
JOHN MCFARLAND,
Richmond, Danville & Piedmont Railroad,

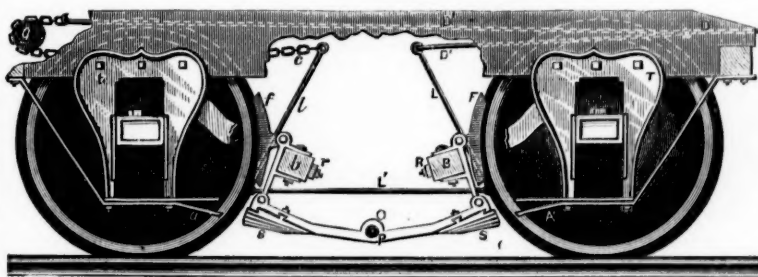
Committee.

Report received and ordered to be spread upon the minutes. Mr. Burke, Memphis & Charleston Railroad—In justice to Mr. Dunbar I desire to make a simple statement. It will be remembered that at our last session I took strong grounds against his packing. He afterward called upon me and asked its trial. Some of it was then put in, which was in the month of October last, and it has since worked very satisfactorily. I am still opposed to that kind of packing, but I make this statement in justice to Mr. Dunbar.

The President announced that there was no report from the Committee on Uniform size of Wheels and Wheel Centers.

TRACK CAR-BRAKE.

In the present number of this paper we give an illustration of a new double-acting passenger car-brake that has been in use for several months on the Philadelphia & Erie Railroad, where, we are told, it has given such general satisfaction that orders have been given for the fitting up of more cars. It works on both wheel and track, and takes no weight of the car, except what may be derived from the friction of the ordinary brakes, whence the rail-brake gets its power. It is very simple, both in construction and operation, and can be worked either by air, steam, electricity or by hand. On referring to the engraving, which represents the truck "cut away," so as to show the brake entire, it will be noticed the wheel-brakes are the same as the old style in general use, only, instead of being suspended from the truck, they are hinged over an arm, *o*, oscillating at the center pin *P*, held by the supports *A a*, and provided with a new design of adjustable track-shoes, *s s*, particularly adapted for track-brakes. The whole being equally balanced at *P*, a small spring keeps it horizontal; but when the ordinary brakes *F f* are applied, their friction on the face of the wheels (whichever way the train may be moving) raises one end of the oscillator, *o*, and forces the rear end down in a dragging position upon the track, and with greater



or less force, according to the amount of pressure the brakeman puts upon the wheels; therefore, there can be nothing rigid, as is the case where the power is applied direct and positive.

The inventor believes that its practicability is fully established by its successfully working for months on the Philadelphia & Erie Railroad.

A more practical illustration of its working could not be given than the example of a boy drawing a pole after him, in which position he can travel over smooth or rough ground, go slow or fast, and bear on as hard as he likes; but if he were to reverse the stick and push it in front of him, he would be apt to come to a sudden stop. This rail-brake acts on the same principle, and from the way it is applied it is impossible to get the forward shoe upon the track, for the wheels govern the direction of motion in its friction with the ordinary brake, which latter, traveling on the surface of the wheels, also allows the rail-shoes to raise or lower and adjust themselves to the unevenness of the track. It is this peculiarity especially which the patentee believes secures the success of the brake.

TRAFFIC AND EARNINGS.

—The receipts of the Suez Canal during the nine months (January to October), 1871 amounted to 7,736,000 francs, against 4,446,000 francs for the same period last year. The receipts must, however, be doubled to cover the expense of working and maintenance and the interest on the obligations.

—The earnings of the Grand Trunk of Canada for the week ending October 28, were:

1871.....	\$40,500
1870.....	31,300
Increase (30 per cent.).....	\$9,200
And for the week ending November 4:	
1871.....	\$40,600
1870.....	30,300
Increase (34 per cent.).....	\$10,300

—The earnings of the St. Louis & Iron Mountain Railroad for the second week in November were: 1871, \$38,285; 1870, \$31,030.78; increase, \$7,254.22. The earnings Jan. 1 to Nov. 15, 1871, were \$1,401,212.09; same period in 1870, \$1,179,644.20; increase in 1871, \$231,567.89.

—The following is a statement of the iron shipments over the Marquette & Ontonagon Railroad for the season of 1871, up to and including Saturday, October 21:

EASTWARD.	
Iron Ore.	
Lake Superior Iron Company.....	145,042
Washington Iron Company.....	47,887
Champion Iron Company.....	64,740
Cleveland Iron Mining Company.....	42,193
Edwards Mine.....	26,701
Winthrop Iron Company.....	4,981
Michigan Mine.....	422
New England.....	33,591
Pitts. & L. A. Mining Company.....	1,062
McComber Mine.....	4,099
Harlow Mine.....	83
Negaunee.....	44
Ore to local furnaces.....	19,045
Total tons ore.....	389,890

Pig Iron.	
Collins Iron Company.....	3,693
Bancroft Iron Company.....	3,752
Morgan Iron Company.....	9,056
Michigan Iron Company.....	6,897
Iron Cliffs Company.....	139
Total tons pig iron.....	23,537
Miscellaneous freight.....	4,635

Total tons eastward.....	418,063
WESTWARD.	
Ore to local furnaces.....	13,317
Miscellaneous freight.....	14,435
Morgan Iron Company, pig iron.....	35

Total tons westward.....	27,787
Total tons east and west.....	445,850

The iron shipments from Lake Superior are nearly all made over this road to Marquette, or over the Peninsula Division of the Chicago & Northwestern to Escanaba.

—The Cleveland Plaindealer says: "The enormous increase of railway freights is one of the marvels of recent business development in the United States. Notwithstanding the immense increase of railroads in all the Northern States, there is not now one of the leading lines which is not fairly blocked with freight. It may be, moreover, broadly stated that not one of the great east and west roads possesses to-day tracks and machinery to do properly the business that crowds upon it. The Pennsylvania Central, the Lake Shore, the Erie and the Atlantic, and the Baltimore & Ohio, are all in the market this fall as heavy purchasers of new engines and cars, one of these lines having in process of construction one hundred and twenty new engines, and another two thousand five hundred cars of a single class. Car and locomotive builders are surfeited with orders covering all the work that they can possibly turn out for months to come. Not less notable is the enlargement of the capacity of the roads themselves. Lines that for years have struggled along with single tracks, now yield to the pressure of growing trade, and are laying with all possible dispatch a second line of rails. The double track of the Lake Shore road throughout its whole length is an example of this. The Pennsylvania Central is rebuilding entirely its eastern division, straightening the last thirty-five miles so much as to save seven miles in that distance."

—The following were the earnings of the Pacific Railroad of Missouri for the second week in November: 1871, \$78,614; 1870, \$76,603; increase, \$2,011. And for the current year commencing 1st of March: 1871, \$2,670,655; 1870, \$2,574,771; increase, \$95,884.

—The earnings of the Lake Superior & Mississippi Railroad for the week ending Nov. 16 were \$21,000.77, including \$17,671.21 from freights. Continued through the year, this would be at the rate of \$7,000 per mile.

—The earnings of the Michigan Central Railroad for the first two weeks of November were:

	1870.	1871.	Increase.
Week ending Nov. 7.....	\$107,890 82	\$129,752 87	\$21,862 05
Week ending Nov. 14.....	107,220 18	122,527 17	15,306 99

This is an increase of more than 20 per cent. for the first week and more than 14 per cent. for the second week.

—The receipts of the Great Western of Canada for the week ending October 27 were \$22,820, in 1871, against \$16,643, in 1870, showing an increase of \$6,177, or nearly 40 per cent.

—The earnings of the Indianapolis, Bloomington & Western Railway for the last week in October were \$25,323.41, and for the month of October show an increase over the corresponding month in 1870 of \$47,002.97.

—The following are the earnings of the Union Pacific Railroad Company for October:

	1871.	1870.
Earnings.....	\$777,362 96	\$719,697 80
Expenses.....	395,322 31	346,604 28
Net earnings.....	\$382,040 65	\$373,093 52

January 1 to October 31:

	1871.	1870.
Earnings.....	\$6,343,698 43	\$6,553,244 09
Expenses.....	2,998,158 95	4,110,280 44
Net earnings.....	\$3,345,539 48	\$2,442,963 65

The expenses for October, 1871, include \$98,195.28 taxes.

The net earnings in 1871 show an increase over 1870:

For October.....	\$8,947 13
For nine months previous.....	\$98,538 70

And for ten months.....\$902,488 83

Comparative statement since opening, 10th May, 1869:

	First fiscal year, May 10, 1869 - April 30, 1870.	Second fiscal year, May 1, 1870 - April 30, 1871.	Six months of third fiscal year, May 1, "1 - Oct. 31, 71.
Earnings.....	\$8,364,592 56	\$7,333,961 35	\$4,285,961 30
Expenses.....	5,797,938 56	3,898,704 26	1,933,744 26
Net earnings.....	\$2,566,654 00	\$3,435,257 09	\$2,352,217 04
Percentage of expenses.....	69.30	53.16	44.13



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Editorial Announcements.

Address.—The RAILROAD GAZETTE will be printed for the present in New York; our printing house in Chicago having been destroyed. All communications, therefore, whether editorial or business, should be directed to the New York office. The proprietor will receive subscriptions and advertisements at his office in Chicago, Nos. 63 and 65 South Canal street, but letters should be addressed to New York.

Correspondence.—We cordially invite the co-operation of the railroad public in affording us the material for a thorough and worthy railroad paper. Railroad news, annual reports, notices of appointments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the public concerning the progress of new lines, and are always glad to receive news of them.

Articles.—We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.

Inventions.—No charge is made for publishing descriptions of what we consider important and interesting improvements in railroad machinery, rolling stock, etc.; but when engravings are necessary the inventor must supply them.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

THE NARROW GAUGE AND THE WEIGHT OF CARS.

We fear that many of our readers are growing very tired of this subject. Its importance, however, and the letter of Mr. Schuyler, published in this number, seem to justify us in devoting some space—now sadly needed for other subjects—to the consideration of his arguments and the facts involved therein.

The difficulty in the discussion of this subject, which is the cause of endless misapprehension and misunderstanding, arises from the fact that in the comparisons of cost, etc., which are made, the conditions are not the same in both cases. If our opponents on this subject contend that a narrow-gauge road, with facilities inferior to those of a wide-gauge road for transporting passengers and freight will cost less than the latter, then they may discontinue the discussion at once, because we and all who agree with us will concede that much, if it is the only question at issue. That to which we are and have been addressing ourselves is, the difference in the cost of building, equipping and operating roads of say, 3-foot and 4ft. 8½in. gauge, with exactly the same facilities—or as nearly as the difference of gauge will permit—for doing the same business on the same line. Of course, whatever advantages are inherent or are dependent upon the distance between the rails each may claim. For example, it is manifestly unfair that the weight of a car per passenger in which the seats are only 30 inches apart should be compared with that of one in which they are 33 or 33, or that a car having six-wheeled trucks and 30-inch wheels should be compared with one with four-wheeled trucks, unless the distance between the rails would give the small wheels an advantage on the one road which they would not have on the other.

In order to make this view of the case as clear as possible, we will suppose that a railroad is needed in a section of country with a small traffic and little capital. At the present time the question would at once arise, whether it

would be best to adopt a wide or a narrow gauge. If, now, persons interested in such a project should determine upon the facilities which the traffic of the proposed line would require, it would remove much of the ambiguity which ordinarily surrounds the question. We will suppose they have investigated the subject, and they have determined that their freight trains should run at an average speed of 15 miles per hour, and passenger trains 25 miles per hour; that the grades should be the same whether the road was wide or narrow; that if it was a 4ft. 8½in. gauge, the shortest radius of curvature should be 400 feet, and that the resistance per ton of train on the shortest curves of a 3-foot gauge should not exceed that on a curve of 400 feet of the wide gauge, the fact to be determined by actual experiment with a dynamometer when the road was completed. We name 400 feet, because curves of that radius were for a long time used on the main line of the Baltimore & Ohio and other railroads and were successfully operated. Of course any other radius, say 300 or 600 feet, could be stipulated, at the discretion of the parties interested. If they have sought information on roads which have used four-wheeled cars for general traffic, they will have learned that their use in this country in nearly every case either has been or is being abandoned, and therefore it would probably be stipulated that the cars should all have double trucks, of the ordinary American plan.

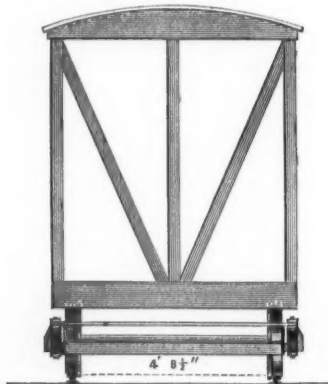


Fig. 4.

The seats for passengers to be 18 inches wide and 30 inches from center to center. Each car to have an aisle not less than 18 inches wide and a saloon 2½x3 feet. The proportion of floor area and cubical contents to the carrying capacity of freight cars to be the same as that of the cars on ordinary railroads—say the Pennsylvania. The greatest weight to be carried on one wheel of any vehicle not to exceed 5,000 pounds. The weight of rails to be

determined by Rankine's rule, i. e., "the weight per yard to be 15 pounds for each ton of the greatest load on one wheel." If the adoption of the narrow gauge is taken into consideration at all, of course it is understood that cars of the ordinary gauge will not be required to run on the new line; if they were, the narrow gauge would be out of the question. Those stipulations could, of course, be modified to suit circumstances, but we will consider the respective advantages of a 3-foot and 4ft. 8½in. road, upon the supposition that the same conditions are to be fulfilled by whatever gauge is adopted.

Having this clearly in our minds, let us see how the freight car for the Denver & Rio Grande Railway—of

instead of 17,600. To say that "few articles of general traffic are so bulky in proportion to their weight that they would fail to load the car to its full capacity," is not a very exact statement, nor supported by any statistics or facts. Such articles as agricultural implements, boots and shoes, carriages, cotton, fruit, furniture, leather, live stock, hay, wooden ware, etc., all require at least a cubic foot of space for every 15 pounds of weight. Upon investigation it will be found, we think, that of nearly half the freight shipped in box cars, not more than 15 pounds can be loaded per cubic foot, and that, therefore, if the size of cars is reduced so as to give only a cubic foot of space to 26 pounds of freight, practically their carrying capacity is lessened at the same time.

It is also obviously unfair to compare the weight of a car which gives a cubic foot of space to 15 pounds of freight with one which gives only the same space to 26 pounds. If the Pennsylvania car were reduced in size it would weigh less; and if the Denver & Rio Grande car were made larger it would weigh more.

The proportion of dead to paying weight of the Denver & Rio Grande car, if its capacity were calculated for the same bulk of freight as the Pennsylvania car, would be 1 to 1.16, instead of 1 to 2. Considering that the cars on the Erie—6-foot gauge—road weigh 18,500 pounds and carry over 21,000, or a proportion of 1 to 1.14, we do not see that the evidence furnished by the Denver & Rio Grande car, to prove that the proportion of dead to paying weight is reduced by narrowing the gauge, is very conclusive.

If the advocates of the narrow-gauge system assume the position which has recently been taken by *Engineering*, viz., that the dead weight of small cars is much less on the narrow gauge than on the broad, then we must ask what difficulty there would be in transferring the Denver & Rio Grande car body to the wide-gauge trucks, as shown in the view herewith; and if none, whether its weight would be increased by such a transfer; and if not, how much more the trucks would weigh for the one gauge than for the other? The proportion of the width of car body to that of the truck, as shown by the engraving, is not, we think, the best which could be devised, but would be very much improved by widening the former: nevertheless, if it be desirable that the width of car bodies should not exceed 6 feet, it can be run on 4ft. 8½in. trucks. If they were made 8 feet wide and 16 feet long, there would be the same floor area, while the longitudinal floor timbers would be shorter, and could therefore be lighter, and the sides or walls of the wide car would be only 48 feet long, instead of 56 feet for the narrow one. The truss rods would also be shorter, and could be lighter and have the same strength. The transom timbers and rafters should, of course, be made heavier, but it must be remembered that while they are lengthened only two feet, the

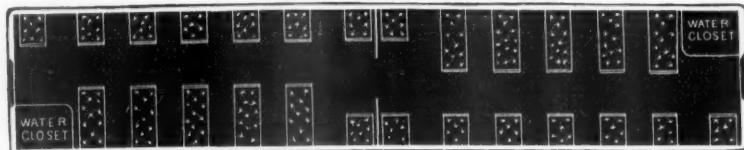


Fig. 5.

longitudinal timbers are shortened six, and that when the car is shortened, only one of the two 3x9 inch "corbels" would be required.

A long and narrow car body is not an economical form of construction, because more weight is required to strengthen the longitudinal timbers than is saved in the transverse pieces, and also because a greater length of side or wall is required to inclose a given area of that form, than if it approximates to a square.

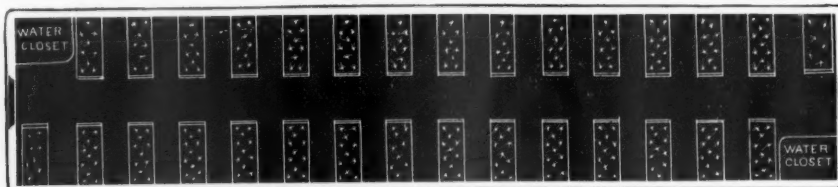


Fig. 6.

which we give an illustration on another page—fulfills the conditions. A Pennsylvania Railroad box car measures inside 26½x8 feet wide, and is 6ft. 3in. high, which gives 1,325 cubic feet of available space. It therefore carries 15 pounds to each cubic foot. The narrow-gauge car has 680 cubic feet, and not 792 as Mr. S. has erroneously stated,* and therefore if it was rated at 15 pounds per foot would have a capacity of 10,200 pounds

* This arose from his calculations being made with the dimensions of the car outside of the studding, instead of inside.

Inasmuch as the width of 3-foot gauge cars is confined within narrower limits than those for 4ft. 8½in. roads, to that extent is the former gauge a disadvantage. If, therefore, box-cars with the same cubical capacity and strength as the one we have illustrated were required for a 4ft. 8½in. road, they could be built of the same, or possibly less, weight than for the narrower road, because they could be widened on the one and could not be on the other.

With reference to the weight of passenger cars, it may be remembered by some of our readers that in the article

published in the GAZETTE of August 19 we gave the weight of the Denver & Rio Grande passenger car as 15,000 pounds, with seats for 34 passengers, which gave a weight of 441 pounds per passenger. We also described a car on the New Jersey Railroad which weighed 26,100 pounds, and would seat 60 passengers, with the same space for each as in the narrow-gauge car. This gave a weight of 435 pounds per passenger.

It may also be remembered that in the GAZETTE of September 23 we published a letter from the builders of the Denver & Rio Grande passenger cars, in which they stated that we "failed to mention whether or not the New Jersey car, like the narrow-gauge car, has *two saloons, a partition, and a stove.*" We should not refer to this again, were it not that Mr. Schuyler has called attention to the same subject, and therefore we give herewith a plan of the two cars whose weight was compared. The one, fig. 5, is that for the Denver & Rio Grande road, and fig. 6 the New Jersey car. In the latter the seats are arranged the same distance apart, and with two saloons, the same as in the narrow-gauge car, without stoves. The one seats 36 passengers and weighs 15,000 pounds; the other seats 60 passengers and weighs 26,100 pounds. The first, however, has four-wheeled trucks with 24-inch wheels, while those of the New Jersey car have six 30-inch wheels; therefore, in order to make the comparison entirely fair, the weight of four 30-inch wheels—which weigh 480 pounds each—and two axles—of 280 pounds—with the springs, boxes, etc., should be deducted from the weight of the car. Their weight would amount to at least 3,000 pounds. Therefore the weight of car which should be used for the comparison would be 23,100 pounds, or 385 pounds per passenger. It must also be remembered that the wheels under the wide-gauge car are 20 inches in diameter and weigh 480 pounds, while those under the narrow-gauge car are only 24 inches in diameter, and weigh 275 pounds, and therefore that eight of the large wheels are heavier in proportion to the weight they carry than the small ones on the narrow-gauge car.

Mr. Schuyler says that the car we have selected for this comparison "is in use only as a smoking car or second-class car." To determine this we wrote the following note to Mr. Barker, to which he made the reply which accompanies it:

GEORGE W. BARKER, Esq., Master of Transportation,
New Jersey Railroad & Transportation Co.:

DEAR SIR: Will you inform me in what class of traffic car No. 29—of which you were kind enough to give me the weight in your letter of August 12—is or was then employed?

Yours respectfully,

EDITOR RAILROAD GAZETTE.

EDITOR RAILROAD GAZETTE:

DEAR SIR: Car 29 is in daily use on our local trains, carrying our regular first-class passengers.

Yours truly, etc.,

GEORGE W. BARKER,
Master of Transportation.

These cars, with the saloons as we have drawn them in the plan, will give as much comfort as and would be preferred to those of the Denver & Rio Grande car by nearly all travelers. It is true they have some of them grown dingy from long use, and that their finish is not so ornamental as is all the work done by the Jackson & Sharp Company; but the ornament adds very little, if at all, to the comfort of the travelers or to the weight of the cars.

Some of the other cars on this road give even less weight than the one we first referred to. Car No. 42, for example, weighs 27,400 lbs., and would seat four more passengers than No. 29, and therefore, with the deduction for the four extra wheels and attachments, will weigh only 381 lbs. per passenger.

It has also been said that nowhere else would we have found cars so "frail" as the one we cited. Now, if by "frail" our correspondent means light in weight, we might say that because we knew that the cars on that road are light, is exactly the reason we went there to get their weight; but if he means that the cars have not sufficient strength, then we have only to refer to the fact that twenty or more of them have been in use for half a dozen years on a road doing the heaviest passenger traffic in the country, which fact makes the statement that "light equipment for light broad roads has been tried repeatedly in this country and abandoned" sound somewhat curiously.

In a comparison of the weights of cars it is entirely fair for the advocates of either system to take the lightest they can find for the gauge they advocate, and compare them with cars of the same kind on the other gauge. When, therefore, we are called upon to compare a narrow-gauge smoking car with longitudinal seats with cars having transverse seats, we say the two cars are not of the same kind. We could select wide-gauge cars of that kind for a comparison, and suggest those for the elevated railroad in New York.

If the argument so earnestly advanced by the advocates of the narrow gauge, that the amount of dead weight is reduced by placing the rails nearer together,

is true, then it ought certainly to follow that the dead weight of the cars on a 6-foot gauge would be more than

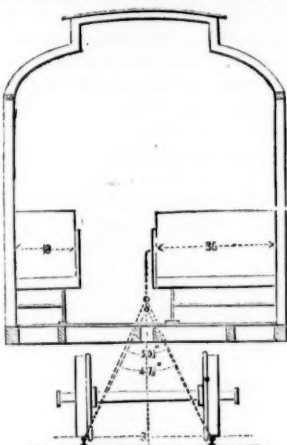


Fig. 7.—Denver & Rio Grande Car.

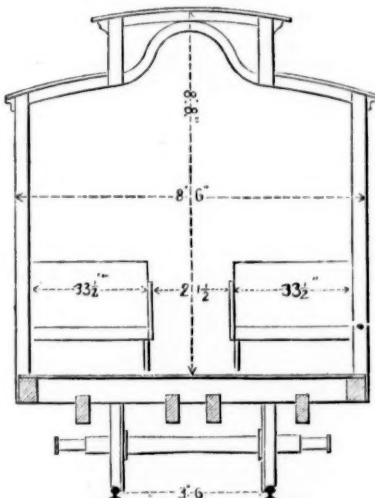


Fig. 8.—Toronto, Grey & Bruce Car.

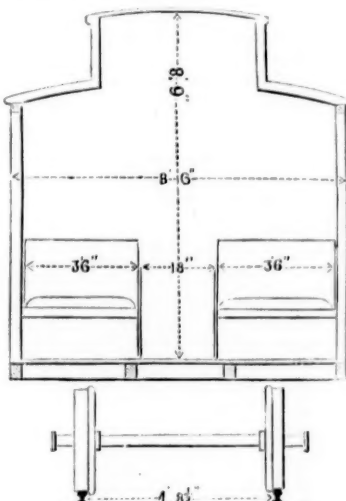


Fig. 9.—New Jersey Car.

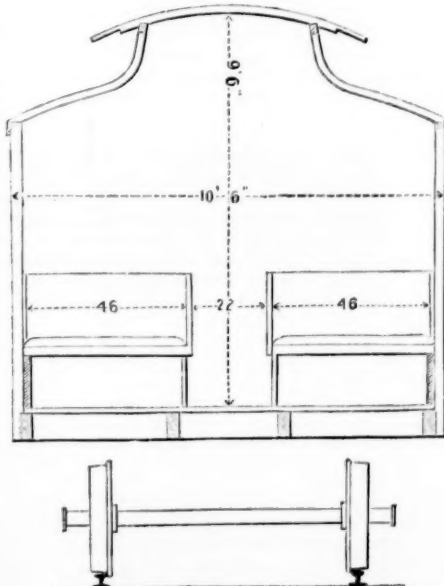


Fig. 10.—Erie Car.

on one of 4ft. 8½in. Now we confess to a little surprise to find that the reverse is the case. In other words, while a box car for the Pennsylvania road weighs 19,000 pounds and is said to carry 20,000, an Erie car weighs 18,500 and carries over 21,000.

Mr. Schuyler also calls attention to the fact that they load 21,000 pounds of railroad iron on two cars which weigh 3,500 each, or a proportion of dead to paying weight of 1 to 3. He says: "I should certainly like to see a train made up upon a broad gauge of any cars which would weigh so little and do so much as these." We accept the challenge, and submit the following account of the weight and work done by timber trucks built and used on the Baltimore & Ohio Railroad for carrying ship timber:

"The trucks of which you speak carried the load upon sixteen wheels. The two trucks weighed 11,000 pounds each (22,000), and they both carried a load of 60,000 pounds, and I have known them loaded up to 80,000 pounds."

We omit the writer's name because he has not authorized its use.

In order that a better idea may be formed of the proportions of cars for different gauges, we give herewith sections of some for 3ft., 3ft. 6in., 4ft. 8½in. and 6ft. gauges. They are all drawn to the same scale, so that a very good idea can be formed of their relative size.

If the cars for the wide gauges were contracted in the width of seat and in the height of roof, the same as for the narrow gauge, considerable weight could be saved.

In this connection we wish to call attention to the fact that the Erie car, which is 49ft. 9in. long, and 10ft. 6in. wide, and weighs 33,500 pounds, will seat 67 passengers. Now if the seats were arranged for two on one side of the aisle and three on the other, and with the seats 19in. wide instead of 18, and the same distance apart longitudinally that they are on the 3ft. gauge, 87 passengers could be seated, with two saloons, and with more room for each passenger than in the narrow-gauge car, and with a dead weight of only 385 pounds per passenger.

Surely this is conclusive evidence, disproving the theory that the dead weight is reduced in proportion to the gauge. If a car can be made to have less dead weight per passenger on a 6ft. gauge than for one of 3ft., then it would seem as though the gauge had very little to do with the question.

There is an argument which is often used in favor of a narrow gauge, which, unfortunately, like many other errors, is easier stated than refuted. The reasoning is, that if a 4ft. 8½in. gauge is better than one of 6ft., then one of 3ft. must be better than 4ft. 8½in. Now this syllogism is very much like that of the unfortunate patient with his pills: "If," thought he, "one pill will do me good, then the whole box will cure me," and, forsooth, he took them all at one dose. If the reasoning proved anything, it would demonstrate that a single rail was the perfection of gauges.

It is also asserted by nearly all advocates of the narrow gauge that the resistance of cars in passing around curves is materially less on a track of which the rails are 3 feet apart than on one in which they are 4ft. 8½in. apart. None of them, however, to our knowledge, have yet stated *how much less* the resistance is on the one road than on the other. It may be so little as not to be worth consideration. Will some of them enlighten us, because we very frankly admit that we do not know, but, at the same time, can see no reason why the gauge should have any effect upon the *flange* friction, to which our correspondent calls attention, and which, we believe, would practically be the same on any gauge, or on a single rail.

With reference to our estimates of cost, although our correspondent expresses a general want of confidence in them, yet he gives but one reason for the want of faith in him. We refer to the item of masonry. Now it may be as well for us to admit that we were not as explicit in that matter as we should have been. If the bridges are built wide enough to permit the running of ordinary cars over them, the cost of masonry will be increased over that required for a narrow gauge. If, however, the cars to be run over them are of the same width as those on the narrow gauge there would be no difference in cost. Culverts must, of course, be longer for a wide-gauge track than for a narrow one. Their cost may or may not be included in that of grading.

The cost of engine-houses, car-shops, etc., will be no greater for the one road than for the other, if the one is built to do exactly what the other will do. If, however, you build a light road in such a way as to be able to run heavy cars on it, the cost will certainly be more, but then the comparison is no longer one of the cost of two roads to do the same work or to fulfill the same conditions. It must be remembered, however, that the light wide-gauge cars under any condition of things can be run on a heavy road, if desirable, which cannot be done with narrow-gauge cars; and also that by a little extra expenditure the wide

gauge road can be adapted for ordinary cars, but that no expenditure of money would do this with a narrow gauge.

Much of Mr. Schuyler's reasoning seems to be intended to establish the fact that when wide-gauge roads are built the tendency to run heavy rolling stock on them is so strong that it cannot be resisted, and such roads speedily become—what? Why, ordinary railroads! Now, if this tendency is so irresistible, there must be some good reason for it; and therefore whatever prevents obedience to it, instead of being an advantage, is an evil.

If, as we have taken occasion to remark in previous articles, a narrow-gauge road to do any given service in a given way can be built, as the advocates for it claim, for three-fifths the cost of a similar road of the ordinary gauge, then their case is proved, and there is nothing more to be said for the other side. The burden of the proof, however, is on their shoulders, and it is for them to show that they can build lighter cars, run shorter curves, climb steeper grades, build cheaper bridges, use lighter iron and do less grading for their line than is required for a line with a wide gauge to do the same service. What we say is, that they cannot build cars which will weigh only three-fifths as much as cars of the same character for a wide gauge; neither can the curves be shorter, the grades steeper, the bridges cheaper, the iron lighter, or the grading less in anything like the proportion named.

We do not wish, nor is it necessary, to speak for the *Scientific American*. It is able to do that for itself. It has seen proper to agree with what we have said of the relative cost of wide and narrow-gauge roads, and we suppose did so for good and sufficient reasons, or what seemed such to its editors. At any rate we feel quite sure that it was not because the ideas expressed therein had the patronage of men of very great wealth or pecuniary influence.

New Issue of Pittsburgh, Fort Wayne & Chicago Stock.

Mr. G. W. Cass, the President of the Pittsburgh, Fort Wayne & Chicago Railway, has given the following notice of an issue of additional stock to the New York Stock Exchange:

"In compliance with the regulations of your Board, I hereby notify you that the Pittsburgh, Fort Wayne & Chicago Railway Company will issue on and after December 21st prox., 20,000 shares of a new stock, to be designated as 'Special Improvement Stock,' under which name I respectfully request to have it called at your sessions.

"This issue is made in conformity with article 16 of the lease of the railway of this company to the Pennsylvania Railroad Company, and represents actual cash values of property placed upon the railway by the lessee, the title to which property is now in this company.

"The shares are to be \$100 each, entitled to dividends of 7 per cent. per annum, payable quarterly, free of all taxes, from the means provided by the Pennsylvania Railroad Company, as stipulated in an agreement of said company, a certified copy of which is indorsed on each certificate; but this issue is in all respects subject to the original or guaranteed stock to have distributed to it in quarterly installments an annual dividend fund of \$1,380,000, free of all taxes.

"I beg to hand you herewith copies of article 16 of the lease, and of the agreement indorsed on the back of each certificate."

This issue of \$2,000,000 is an increase of more than 10 per cent., and will add \$140,000 to the rental charge of the Pennsylvania Company. Just what the "property placed upon the railway by the lessee" consists of, Mr. Cass' letter does not inform us. Doubtless the rolling stock has been increased, as the business of the road certainly has, and "article 16 of the lease" seems to provide very neatly a method by which the lessor furnishes the capital for needed improvements. However, it is not likely that the \$2,000,000 has all been expended as yet, but rather that it is to be, as fast as the new stock is sold. Whether this will be a cheap way of raising money for improvements depends, of course, on the price at which the "special improvement stock" can be sold. The interest on this stock is guaranteed by the Pennsylvania Railroad Company, though subordinate to the old stock, and it is not easy to see how a dividend can be passed so long as the Pennsylvania Railroad Company can pay its debts. The investment of a few millions in improving the Fort Wayne road, we feel sure, will be more sure to pay than an investment in almost any new railroad in America; for, though the road is now in magnificent condition and excellently equipped, improvements which will be comparatively not costly will very largely increase its capacity, and it is almost absolutely sure to have all the business it can do at profitable rates—rates which may be less than the present average, because twice the present business could be done, with sufficient facilities, at doubtless less than one-half greater cost.

To give the requisite capacity for a very largely increased business, however, a second track is needed quite as much as additional rolling stock. Already the road

has nearly as much traffic as a single line can accommodate, and it will probably be found economical to substitute steel for iron rails. Now, to complete a double track on the main line between Pittsburgh and Chicago would require an expenditure of about \$3,000,000 for iron alone, so it is easy to see that the proceeds of the new issue of stock may be very well invested.

As to the effect on the holders of the old stock, it may somewhat modify the selling price of their property. They, of course, are not all concerned in improvements of the property so long as the lessee fulfills his contract.

Westward Freight Rates.

On Monday, the 27th inst., a new and advanced tariff of freight rates westward went into effect. For about four months past the rates have been extravagantly low—lower than ever before, we believe—and the advance brings them only up to about ordinary summer rates. The new rates are as follows:

New York to—	Classes				
	1st.	2d.	3d.	4th.	Spec'l.
Cleveland.....	.66	.59	.46	.36	.30
Cincinnati.....	.63	.56	.43	.33	.27
Louisville.....	1.14	1.03	.82	.64	.55
Chicago.....	1.00	.90	.70	.55	.45
Milwaukee.....	1.09	.99	.79	.55	.45
Detroit.....	.71	.64	.50	.39	.32

The rates previously were, to Chicago, 35 cents per hundred for the four classes and 26 cents for special. Under these rates immense shipments have been made, as they continued during the busiest season of the year, when Western merchants were laying in their stocks and when the largest shipments of produce eastward were made. These eastward shipments have, as usual, exceeded the westward shipments, although the rates on the former ranged from 50 to 300 per cent. higher. Of course the comparatively high rates on the eastward shipments have made up for any possible loss on westward business, and we imagine that on the whole the fall business has been altogether satisfactory in net profits, as it certainly has been in bulk and in gross receipts.

NEW PUBLICATIONS.

Deutsch-Amerikanische Oeconomist.—This is the title of a newspaper established last spring at Frankfort-on-the-Main, which is one of the great financial centers of Europe. This journal is devoted especially to the trade, commerce and finances of the United States, and particularly to those aspects affecting the soundness of financial schemes which seek for capital in Germany. In that country, although there is in the aggregate a very large amount of capital seeking investment, comparatively little of it is in the hands of men of wealth. The large subscriptions to United States and other bonds have come in dribbles, as it were, one or a few hundred dollars each being taken by small tradesmen, farmers and others, who do not easily find at home opportunities for investment at what we would call a reasonable interest, and who make very little use of savings banks, which in this country absorb the great bulk of the savings of those who have but a few hundreds of spare capital. Investing as they do in foreign securities to a great extent, and often in railroad securities whose basis can be very little known to them, these investors must rely to an extent unknown in America, and much more than is usually the case in England, upon the judgment of the bankers through whom they make their investments. We can readily see how the thrifty tradesman who, acting on a banker's advice, bought five-twenties in 1863 or 1864 at 40 or 50, and has received his semi-annual interest promptly ever since—giving him an income of 12 or 15 per cent.—and had them gradually rise to par, will be very likely to trust that banker again when he recommends New York & Oswego Midland, or Northern Pacific as a safe and profitable investment. But this also makes it necessary for the banker to be exceptionally well-informed concerning the securities he sells; for if his reputation is made by the recommendation and sale of a safe and profitable investment, it may be very seriously injured and his business greatly limited by recommending and selling securities which turn out to be unsafe and unprofitable. If an investor is ready to confide in him who, through an investment in United States bonds, gave him 12 per cent. on his money for seven or eight years and then doubled the principal, he is quite sure to distrust the broker who recommended and sold to him Rockford, Rock Island & St. Louis bonds, and thus very soon deprived him of half his capital and all his interest. Therefore we see that the German banker has reason to be exceptionally well informed concerning the securities he sells, as he not only recommends them to his customers, but his customers are those who usually have scarcely any, if any, means of judging for themselves of the value of the securities offered them. When a Connecticut farmer is offered St. Joseph & Denver bonds, he has some means of estimating their value; but if he were offered securities of the Cologne & Minden Railroad of Germany, he would, doubtless, be utterly unable to judge whether the paper was worth anything, and if he purchased them it would be because of the recommendation of some one whose knowledge and judgment he fully trusted.

The *German-American Economist*, we are informed, is designed to aid in giving trustworthy and unbiased information on such matters as are likely to affect the success of public works, etc., in America, for which capital is sought in Germany. It is published, we are informed, by an association of bankers who are especially interested in American enterprises and who,

besides this paper, have trustworthy agents and attorneys in all the principal cities of the United States, who are instructed to make a searching examination into every railroad or other project whose bonds are offered in the Frankfort market.

Such a work well done, it is needless to say, will be of the greatest value to German bankers and investors, and not less so, we are ready to affirm, to all honest and healthy projects in this country and to the whole American community. There are abundant opportunities in this new world for the profitable investment of capital, and there is an abundance of capital in the old world ready for investment in safe enterprises at rates which we can well afford to pay. But wild and dishonest schemes have caused a loss to so many that foreigners are apt to be distrustful of the best and most trustworthy, and the percentage paid by the better securities is much larger than it otherwise would be. Thus we see that every unsound and dishonest project is a drag on all the rest, and the whole country is taxed because some men and corporations have failed, through dishonesty or bad judgment, to meet their engagements with those who have capital to lend us. Whatever service, therefore, the *German-American Economist* can do in giving correct ideas of the value or worthlessness of proposed railroad and similar works in this country will be a great service to America as well as to Germany.

Map of the Railroads of Pennsylvania and Parts of Adjoining States.—Mr. J. A. Anderson, Superintendent of the Belvidere Delaware Railroad, of New Jersey, has prepared from official data, and Mr. J. L. Smith, of Philadelphia, has published, a map with the above title which many of our readers will be glad to hear of. It is on a sheet 30 by 40 inches, includes the territory as far east as Trenton, Bordentown and Port Jervis, as far west as Wheeling, W. Va., and Ashtabula, O.; north so far as to show Dunkirk and Ithaca, N. Y., and south to Baltimore, Md., and Winchester, Va. That it is much more than a map of Pennsylvania is shown by the fact that it gives the whole of the Baltimore & Wheeling line of the Baltimore & Ohio Railroad, and most of the Parkersburg Branch, and all the main line of the Erie Railroad to Dunkirk which is west of Port Jervis.

The map is drawn on a scale of eight miles to one inch, which is large enough to show even the complicated ramifications of lines in the anthracite coal fields. It is essentially a railroad map. No places except those on railroads are given; but the streams are given with considerable minuteness, and the counties are named and their boundaries indicated by fine dotted lines. The absence of towns not on any railroad will sometimes be felt as a drawback in using this map; but it is unquestionable that by leaving them off, the railroad system is indicated much more clearly than could have been done otherwise, which, doubtless, was the chief object in view in designing the map. We can hardly praise too highly the manner in which they are presented. While the rest of the map is printed in black, the railroads are in vermilion—bright lines, seen at a glance and entirely distinct from everything else on the map. So distinct are the lines that we think they might better have been made less heavy. Along each road is printed its name. Each station is given with its name, and under its name are figures giving in miles and tenths the distance of that station from the terminus of the road. Thus the map is made an exceedingly convenient table of statistics as well as a map. Almost instantly you can tell by inspecting it the distance by railroad between any two places named on it. This is often a very great convenience, as every one who has occasion to find such distances must know, and will, doubtless, make this map very popular with a large class of railroad men and with travelers. Indeed, we should say that such a map ought to form an indispensable part of the furniture of every station in the territory which it includes. We are sure that it would be of great service to every station agent who desired to do his duty understandingly, and passengers would find it extremely useful in many cases. And we hope, further, that this excellent example may be imitated until every State shall have a similar map on which it will be easy to find quickly any railroad and any station on any railroad.

Mr. Anderson is to be praised not only for the clearness of his map, but for its completeness and accuracy. We believe we have never before examined a map of any portion of the United States on which we found the railroads laid down correctly. In every other case we have found either some railroads omitted or lines shown where none existed, and usually several cases of each. We will not say that there are absolutely no omissions or redundancies on Mr. Anderson's map, for the railroad system of Pennsylvania is exceedingly complicated, and we cannot pretend to have in mind every short line and its position; but after a careful examination we have detected no errors; projected lines on which some work is done are indicated, and indicated correctly, so far as we know, by dotted lines. The map is not defaced by lines which are as yet only talked of, and the whole gives a complete and correct idea of the railroad system of Pennsylvania as it is to-day.

The map may be had of the publisher, J. L. Smith, No. 27 South Sixth street, Philadelphia, and we hope that it will be ordered in quantities by the railroad companies of the State for the use of their officials and employees.

Chicago Car Works.

Wells, French & Co., the well-known bridge builders of Chicago, have lately commenced the construction of freight cars at their new shops, in connection with their bridge works. They are now able to build four cars daily, and intend to extend their works next so as to be able to turn out six daily. Mr. C. F. Scoville, for the last fifteen years in charge of the Illinois Central car shops, has the management of these new works.

—William M. McPherson, of St. Louis, has resigned his position as a director of the Missouri Pacific.

Chicago Railroad News.

Chicago, Burlington & Quincy.

Mention was made last week, in general terms, of the new round house in process of construction at Aurora, for the Chicago, Burlington & Quincy Railroad Company. The exact dimensions of the building are as follows: Outside diameter, 279 feet; inside diameter, 161 feet. The structure will contain 40 stalls, of which 15 are already completed.

The new foundry at Aurora, which has just been completed, is of the following dimensions: The main building is 184 feet long by 62 in width; a wing, 97½ by 62 feet. The engine room and cupola room, in an attached building, cover an area of 47 by 33½ feet, and the core oven is situated in another adjoining building, which is 36 by 25 feet in dimensions. All the above-mentioned buildings are of brick, and the buildings are completely equipped with all the most approved cranes and apparatus for conducting the foundry.

A new freight house has also just been constructed by the Chicago, Burlington & Quincy Company at Aurora, 80 feet in length by 24 in width. The old one has been removed to make room for more standing tracks, on account of the increasing business resulting from the opening of the Ottawa, Oswego & Fox River Valley Railroad and the Chicago & Iowa Railroad, and the extension of the main branch lines generally.

Michigan Central.

The Michigan Central Railroad Company has now completed its freight houses at the foot of Lake street, and is fully able to handle conveniently all the freight that Chicago merchants may order. The company has now put under good, substantial slate roofs 50,000 square feet of floor surface for freight purposes since the fire.

The Central Depot.

The Illinois Central and Chicago, Burlington & Quincy railroad companies will land passengers as usual at the foot of Lake street, within about a week, the temporary passenger houses being nearly completed and ready for use.

Chicago & Iowa.

The Chicago & Iowa road completed the extension of its line to Forreston, on Tuesday, the 28th instant. This gives the road a connection with the Illinois Central at that point. The opening of the extension has been somewhat hindered on account of the delay in receiving iron.

Chicago, Rock Island & Pacific.

The Rock Island Company is busy developing the Southwestern Branch. Through trains run regularly on this route, with sleeping cars and all the conveniences of travel to be found on the oldest and best managed lines. It is expected that this will rapidly develop into a first-class feeder of the main line, as soon as the people along its line find, as they will before spring, that Chicago is bound to retain its old business, and get a large increase within a year.

This company has recently completed at its Englewood shops a new and very elegant sleeping-car, the "City of Peoria," which is to run regularly between Chicago and Peoria. Another car, altogether similar, the "City of Ottawa," will be turned out in a few days and put on the same line.

Empire Line.

The Empire Freight Line has established its office since the great fire at No. 128 Pacific avenue, opposite the Lake Shore & Michigan Southern freight depot. It is now receiving and delivering freight the same as before the fire.

Pittsburgh, Cincinnati & St. Louis.

The general ticket office of the Pittsburgh, Cincinnati & St. Louis Railway has been established since the fire in the Tremont House, on the corner of Congress street and Michigan avenue, where the agent, W. S. Tibbitts, and his assistant, J. H. Cook, are regularly to be found.

Chicago & Northwestern.

The Northwestern Company has got its freight houses so far advanced in the North Division as to be able to manage its freight business with its usual dispatch and convenience to the public.

The track of the Madison Extension was laid across Bloom's Bridge, seven miles west of Baraboo, on the 23d ult. This is the fourth bridge west of the Baraboo depot. A large force is now grading between Reedsburg and Wonewoc, sixteen miles, the work being mostly done as far west as Reedsburg. The office of Fox & Howard, the contractors, has been removed from Baraboo to Reedsburg.

A round house with a radius of 163 feet and an outer arc of 154 feet is nearly completed in Baraboo. It is a very fine and substantial building of white brick with stone trimmings, and with a slate roof. With it is connected a well 20 feet in diameter and 45 feet deep.

Trains have been running as far as Oconto on the new Menominee Extension for a week or so.

This week the company declared a semi-annual dividend of 3½ per cent. on the preferred stock. The dividend on common stock for the last half-year is passed. Although there have been no reports of earnings since the close of the last fiscal year, the market price of common stock indicates that the passing of the dividends was anticipated.

Chicago & Alton.

There is a change of time on this company's "Louisiana Route" and in the trains between Chicago and Kansas City, which took place on the 27th inst. The 9 a. m. express for St. Louis via main line, and the 9 a. m. fast express for Kansas City direct via Jacksonville, Ill., and Louisiana, Mo., now leave at 9:15 a. m.

This company is preparing to set out 30 miles of Osage orange plants next spring, between Macoupin Creek and Alton, to fence its line. The work is done under the superintendence of the roadmaster.

The company has adopted on its passenger cars the

"dust shield" invented by W. M. K. Thornton, of St. Louis, and described and illustrated in the RAILROAD GAZETTE of October 1, 1870. It consists of a simple light wooden platform suspended within about four inches of the track, and nearly as large as the floor of the car. It is said to be very effective in arresting dust, which is one of the nuisances that hitherto has refused to be abated.

Heavy Freight Receipts.

After a somewhat protracted and decided freight blockade on all the Eastern lines, the companies have so far completed their arrangements for handling the increased amount of freight as to be in fair working order again. It appears that the leading merchants of this city have filled up the supplies lost by the fire, and have also ordered nearly or quite the ordinary amount of new goods. The country dealers who have bought their goods in Chicago heretofore have very largely abstained from purchasing anywhere else, preferring to wait to see if Chicago could not furnish their supplies as usual; and, in response to this feeling, Chicago merchants have generally ordered large stocks of goods, which they are now rapidly getting into their extemporized buildings; and the probability is that nearly as many goods as usual will be sold here. As an instance of the rapidity of the rebuilding, it may be mentioned that the dry goods house of J. V. Farwell & Co. commenced the erection of a solid brick structure on the corner of Market and Monroe streets immediately after the fire. The building is 50 feet wide by 170 deep. Mr. Farwell has already occupied the two lower stories for his wholesale business, while hundreds of men are at work high up in the frosty air on the fourth story, and putting in the massive timbers for the fifth story.

The Depot Question.

The depot question is in *statu quo*, so far as the mandamus is concerned, which prevents the city from selling to the Illinois Central Company a site for new buildings on the lake front. But it is quite evident that the vast majority of the people of the city are anxious to see the company succeed in the purchase. The fire has occasioned a great many results that are only just beginning to appear. It is apparent, for instance, that the business of the city is to be done over a much wider area than heretofore. Already Wabash avenue is a business street from the burnt district to Twenty-second street, and new buildings are being put up on that aristocratic thoroughfare solely for business purposes—buildings which would not have been tolerated at all before the fire. Michigan avenue, too, is ruined as far as Congress street, and thence to Park row is largely devoted to business purposes. Lake Park, which the Board of Public Works had, for years, in a sickly and indefinite way, been "improving," as a park has totally lost its original appearance, and is covered throughout its entire length of over a mile with business blocks, constructed rudely of wood.

The Board of Public Works has consequently stopped improving the park, but is doing a great thing in the way of enlarging it. All the debris of the burnt district, amounting to millions of cords, no doubt, is transported to the lake front and dumped into the basin, and the basin itself will cease to exist or be reduced almost to microscopic proportions before the end of next season. No doubt from 10 to 15 acres of ground will thus be constructed; and the ideas of the people are decidedly that this ground should be abandoned for park purposes and sold to liquidate the indebtedness of the municipality. It is probable, if this should be done, that the property would more than meet the total indebtedness of the city, which is now about \$12,000,000, since the State has assumed the payment of the canal bonds. The logic of events is certain to make the lake front business property, and it is not very likely that the opposition to the Illinois Central Railroad purchase will be much longer insisted upon.

There has been a good deal of talk of the establishment of one immense union railroad depot somewhere in the South Division. The question has been discussed by the general officers of all the railroads centering in Chicago, but they seem now to have come to the conviction that it will never be accomplished. It is generally regarded as impracticable, all things considered. There are too many companies; they would require too much ground; and the ground, in the location proposed, is too high in price. The railroad men of this city are now generally of the belief that there will be three great passenger depots in this city within from one to three years. The Illinois Central, Chicago, Burlington & Quincy and Michigan Central companies will construct ultimately a magnificent depot on the site now in dispute between these companies and the city. The Chicago, Rock Island & Pacific and the Michigan Southern companies will rebuild their depot on the old site; while the Pittsburgh, Fort Wayne & Chicago, the Northwestern and the Chicago & Alton companies will probably build a union depot in the West Division of the city.

Such an arrangement, which so far as localities is concerned is just about what existed before the fire, the West Side depot being united, however, would make the Central Depot and the West Side depot nearly a mile apart, with the Van Buren Street Depot about half a mile from either. If there can be no true Union Depot for all the roads—as there could be if private interests were subordinated to "the greatest good of the greatest number," of railroads and of citizens—this is, perhaps, as good as any arrangement. It must not be forgotten that the companies have large tracts of land about their stations, which in most cases would be much depreciated in value should the depots be removed from that quarter, while an unnaturally high price would have to be paid for new sites.

The Traffic in Hogs.

The cold weather of the past week has caused the hog trade of this city to open earlier than usual, and a considerably large number have already been sent on East. The freight rates established at present are as follows, per hundred pounds:

To Boston.....	\$1 00
To New York.....	0 90
To Philadelphia.....	0 80

General Railroad News.

ELECTIONS AND APPOINTMENTS.

—The following are the directors and officers of the Pennsylvania Petroleum Railroad Company: F. H. Gibbs, Titusville; Hon. M. B. Lowry, Erie; S. L. M. Barlow, Charles Day, New York; J. G. Dale, Tionesta; J. T. Blair, Pleasantville; B. D. Benson, Enterprise. A. H. Steele, President; Charles Day, Treasurer; J. T. Blair, Secretary; David Jones, Chief Engineer.

—Mr. T. J. Glenn has been appointed General Superintendent, and Mr. Warren G. Sanborn Assistant Superintendent, of the new Maysville & Kentucky Railroad.

—The American Railway Times reports that Hon. A. D. Briggs, of Springfield, a civil engineer, engaged lately in bridge-building especially, has been appointed by the Governor of the State one of the Railroad Commissioners of Massachusetts, in place of Edward Appleton, whose term has expired. Mr. Briggs has been Mayor of Springfield for several years.

—The Memphis & Charleston Railroad Company has created the new office of Vice-President and made Gen. John D. Rather the first incumbent.

—Col. E. D. Frost, for some time General Superintendent of the Mississippi Central Railroad, has been appointed also General Superintendent of the New Orleans, Jackson & Great Northern, which makes him manager of a line from New Orleans to Jackson, Tenn., a distance of 441 miles. Both roads are under one control.

—The recently organized Kalamazoo, Lowell & Northern Michigan Railroad Company elected Thomas S. Cobb, of Kalamazoo, President, and George Kidder, of Kalamazoo, Secretary and Treasurer, at a meeting in Hastings, Mich., November 22. Books are opened for subscriptions and a preliminary survey is in progress.

—A. J. Lane, of Georgia, has been elected President, and B. Dunham, Superintendent, of the Montgomery & Eufaula Railroad.

—The Philadelphia, Germantown & Norristown Railroad Company, whose road is leased by the Philadelphia & Reading, on the 25th ult. elected Winfield Scott Wilson a director for one year, and Joseph Perot, J. N. Williamson, William Musser and W. H. Slinghuif for four years.

—Col. William Coffin has been elected a director of the Missouri Pacific Railroad Company in place of W. M. McPherson, resigned.

OLD AND NEW ROADS.

The Government Account with Southern Railroads.

The report of the Secretary of War will show that, of the Southern railroads which under executive order were allowed at the close of the war to purchase rolling stock and other railroad supplies and material from the United States, twenty-seven have paid their debts in full, with interest, amounting to \$2,465,576. Twenty-four are still in debt to the United States, the amount due being \$4,724,350. In June the Secretary of War accepted a proposition from the Nashville & Chattanooga Railroad Company to pay in full of its debt of \$1,000,000, one-half in ten years and one-half in twenty years from the first of June, 1870, with interest at 4 per cent., payable semi-annually. Large claims presented by several railroads for use and damage by the United States army during the war have been presented, considered and rejected.

Painesville & Youngstown.

The track of this new Ohio railroad is down from Painesville to Chardon, about 12 miles.

California Railroads.

Turton & Knox have contracted for the grading of the railroad between Healdsburg and Cloverdale, 17½ miles long, and also from Petaluma to Bloomfield. To build these roads Sonoma County gives a subsidy of \$5,000 per mile, and both must be completed by the 19th of next March.

A survey is in progress for a railroad to commence at a point on the California Pacific, about ten miles north of Vallejo, thence crossing Napa Creek, near Green Island, skirting the salt marsh and crossing Petaluma Creek south of Donahue; thence *via* San Rafael to Sausalito.

Rockford Central.

This company, which has some grading done on 23 miles of line between Rockford and Richtonville, is talking of a consolidation with the Madison & Portage, which latter, in turn, talks of an arrangement with the Chicago, Burlington & Quincy by which it will get its bonds guaranteed in return for a connection with the Northern Pacific; but connections with Pacific railroads are not likely to tempt companies which have worked hard for a good share of the present Pacific business, got it, and then found it hardly worth taking.

Superior & Northern Pacific.

On Monday, November 6, at the special election held in Superior City, Wis., to determine whether the county of Douglas should take stock to the amount of \$350,000 in bonds in the railroad to connect the city and harbor of Superior with the initial point of the Northern Pacific Railroad, 23 miles west, it was unanimously voted that the stock be subscribed at once. The vote stood 204 to none at all. Duluth is just the same distance from Thomson, the eastern end of the Northern Pacific track, as Superior City, but as the Northern Pacific has very large landed interests in Duluth, it will probably take care that a road to Superior City is not overburdened with its traffic.

Penobscot Bay & River.

Arrangements are made which render it probable that this railroad, along the west side of Penobscot Bay, will be constructed, forming a continuation of the Knox & Lincoln Railroad, and with it making a coast line through to Bangor.

Sugar River Railroad.

This New Hampshire railroad, which is to complete the Concord & Claremont Railroad from its present Western terminus at Bradford westward across the State to the Connecticut River at Claremont, about 40 miles, was completed to Newport village, about half way, on the 22d ult.

West Wisconsin.

The first train to Hudson on this road ran through November 17. Trains will run regularly directly, and when the St. Croix bridge is completed, which will be in January, trains will run through to St. Paul, and then the company will be ready to commence the construction of an extension southward about 20 miles to a connection with the Madison Extension with the Chicago & Northwestern.

The Hoosac Tunnel.

The Boston *Advertiser* says that a proposition has been made by New York capitalists to purchase the Hoosac Tunnel of the State of Massachusetts, with the purpose of suspending work on it and forcing traffic into the existing channels. This would seem to be rather for the benefit of the Boston & Albany, the Vermont Central, the Portland & Oswego, and other lines, than of New York.

Owensboro & Russellville.

This road is completed to Livermore on Green River, twenty-one miles south of Owensboro, with a fine bridge of two 125 feet spans, and one draw of 250 feet in length, over Green River. Fifteen miles more is now ready for the track, which, when laid, will extend to Stroud's City, the junction of the Elizabethtown & Paducah Railroad. The Logan County division was let to contract on the 10th of October, and is now in process of construction. The road will cross the Memphis, Clarksville & Louisville Railroad at Russellville, Ky. The work is in charge of Mr. Edmund Turner, Chief Engineer and Superintendent, who is assisted by Mr. J. P. Claybrook, E. C. Lewis, C. Stacker, H. F. Hager and J. W. Robinnette.

Texas Railroad Land Grants.

Not only have the authorities of the State of Texas refused to deliver to the Houston & Great Northern Company the grant of sixteen sections of land per mile granted it by an act of the Legislature, and been supported by the inferior court in which a suit for the lands was tried, but it is reported that it is questioned whether the Houston & Texas Central and the International will be able to secure their grants without further action by the Legislature. A suit is now pending in the Supreme Court of the State, and if the illegality of the land grants is confirmed by that court, it is probable that there will be for the present no further extension of any of the land grant roads, many of which are of great importance to the State, unless the present Legislature confirms the former action, which for some reason is now pronounced illegal.

International of Texas.

The Houston *Times*, of the 16th ult., says that this road was then completed 46 miles east and four miles west of the point where it crosses the Houston & Texas Central, and is excellently constructed.

Philadelphia & E. A.

It is reported that orders have been given to complete a double track between Warren and Irvine forthwith. This is done in part to accommodate the Dunkirk, Warren & Pittsburgh and Allegheny Valley railroads. When it is done the cars of the Allegheny Valley road will stop at Warren instead of Irvine.

Union Pacific.

Messrs. Morton, Bliss & Co., the financial agents of the Union Pacific Railroad Company, report the following land sales:

Sales—October, 1871, 17,726.74 acres, for \$63,038.40; average per acre, \$3.55; land grant bonds canceled, \$15,000. Total sales to October 31, 1871, 480,141.29 acres, for \$2,030,831.83; average per acre, \$4.23. Lands belonging to the company remaining unsold, 11,599,858.71 acres.

North Missouri.

It is announced that hereafter the officers and employees of this company will be paid on the 15th day of every month and following days, by checks drawn by the Auditor on the Treasurer, at St. Louis, and made payable to bearer on the order of the person whose name appears in the body of the check as authorized to indorse them. The checks will be redeemed by the Third National Bank of St. Louis, and will pass through the Clearing-house in the regular way. Agents and conductors of the road are also instructed to redeem said checks when in funds. This rule is adopted as a convenience for the business of the road, and as the checks will constitute a safe remittance for the merchants on its lines, it is confidently expected that they will always take them at par.

The *Missouri Democrat* says: "As one good result of the action of the County Court in the North Missouri Railroad business, we hear that the construction of four hundred cars and six new locomotives has already been put under contract. The building of these cars will be pushed, and in a few weeks we trust the North Missouri and Central Iowa Railroad lines will be amply stocked for all the business that offers."

Omaha & Southwestern.

The track of the extension of this road from Crete, on the Big Blue, is completed to Beatrice, near the Kansas line.

St. Louis & Iron Mountain.

This company's Arkansas Branch is now completed to Piedmont, 127 miles south of St. Louis and 50 miles north of the Arkansas border, and 18 miles south of the recent terminus at Annapolis. Forty miles have been constructed this season (from Pilot Knob south), and most of the way through a difficult country. For the remainder of the distance, it is reported, grades will be light and construction easy.

Great Western & Canada.

It is reported that this company is about to add 1,000 cars to its rolling stock.

Chicago & Michigan Lake Shore.

The extension of this road to Pentwater, Mich., will probably be completed by the close of the year.

Topeka, Fort Scott & Memphis.

This is the title of a Kansas company which hopes to get money for the construction of a narrow-gauge railroad from Topeka, Kansas, northeast to Fort Scott, and at some time to Memphis. Unfortunately there is no traffic in this direction to support a railroad.

Stonington & Providence.

This Rhode Island company is laying a second track on its road between Providence and Groton, 62 miles.

Mount Tom & Easthampton.

The first passenger train over the Mount Tom & Easthampton Railroad was run on Tuesday afternoon, November 21, by the Connecticut River Railroad, to bring the students of Williston seminary to Springfield, on their way home to spend the Thanksgiving vacation. The road is about five miles long.

Fremont & Sandusky.

A company with this name filed articles of incorporation with the Secretary of State of Ohio, November 16. It purports to construct a railroad from Fremont, Ohio, through the counties of Sandusky and Erie to the city of Sandusky. The company has a capital of \$500,000. The incorporators are R. P. Buckland, E. F. Dickinson, Wm. E. Haynes, George Engler, C. O. Tillotson and C. Edgerton.

Wellington, Gray & Bruce.

The grading on the extension is completed to Paisley, and will soon be commenced on the fourth and last section.

Mississippi & Black River Valleys.

The profile, plots and estimates for this line have been completed. It will be 54 miles in length, starting from the Richmond Junction station, on the Grand Trunk, and running southwest through Melbourne, Brompton, Gore, South Ely, Stukely, South Stukely and Bolton, to a point near the boundary line in Potton, where it meets the Southeastern Counties road from Montreal and the Missisquoi River road via Richford from St. Albans, Vt. A road from this point is projected to Newport to connect with the Passumpsic line. The municipalities along the line have nearly all voted bonuses. It is believed they will all do so, and it is understood that the Quebec Legislature will make the usual allowance, which would amount to about \$100,000.—*Exchange*.

Baltimore, Pittsburgh & Chicago.

A correspondent of the Cleveland *Herald*, writing from Grand Rapids, Ward County, Ohio, says: "The Baltimore & Ohio road has run two lines from the east part of the State, but have joined at Tiffin, which is a point. From there to Chicago the line diverges, one via Napoleon, the other via Defiance. The time for location of the line is now close at hand, and a good many hard things are said about the respective lines by the opposition, i. e., Napoleon and Defiance. An outsider, not knowing anything about the country of these lines, would think it was a wretched country between here and Chicago, so much so a road could not be built, and, if it was, would starve out for want of local business, as there are no towns on either route. To decide the controversy, the Vice President, Mr. Keyser, and the Chief Engineer of the Baltimore & Ohio Railroad have gone on a personal survey of both lines, and the chairman of the railroad committee at Napoleon has given notice that to secure the road some money must be put up forthwith."

Connecticut Western.

Between Hartford and Tariffville the line is a fine one, the grades being easy and the curves few. There are some sharp curves near the picturesque rocky gorge at the Tariffville notch. Beyond Tariffville the line is very good to near Canton Center. At the crossing of the Farmington River in Simsbury there is a good bridge, and nearly 3,000 feet of substantial piling across the flats. Between Hoskins' station and Simsbury, on the Canal road, about two miles, the Connecticut Western and Canal tracks run parallel, 25 feet apart. At Simsbury station the Western crosses the Canal track. Beyond Tariffville about eight miles of the track are well ballasted. Gravel is plenty in this locality, and this work has followed rapidly after track-laying. The condition of the entire line may be briefly stated as this: The track is laid and in good part ballasted from Millerton, the western terminus, to New Hartford. A steam shovel at Winsted loads gravel cars for ballasting each way from that point. From Hartford west, about 22 miles of track are laid and partly ballasted. From Canton to New Hartford about five miles of track are yet to be laid, and this, which will be put down by the early part of next week, will connect Hartford with the New York State line by rail. There are no plans yet for running regular trains, and will not be till after the next meeting of the directors, a couple of weeks hence. For a new road, it rides remarkably smooth and easy, the track being laid generally on heavy ties, with 30-foot rails, connected with the fish joint, and the joints overlapping instead of being opposite each other.—*Hartford Courant*.

Southern Pacific.

This railroad, which now extends from Shreveport, La., westward through Marshall, Texas, 66 miles, is now the property of the Texas Pacific Company. The Shreveport *Gazette* says that it is now making a survey for a branch from Marshall, 42 miles west of Shreveport, nearly due north to Jefferson, Texas, about 15 miles.

Durlington, Cedar Rapids & Minnesota.

This Company has commenced grading a branch line which will extend from Cedar Rapids nearly due north to West Union, Iowa, and thence northeast to a connection with Milwaukee & St. Paul at Postville.

Chicago, Clinton & Dubuque.

The construction company commenced laying track on this road from Dubuque southward on the 21st ult.

Cairo & Vincennes.

The Shawneetown (Ill.) *Mercury* reports that work has been resumed on this road, for some years abandoned, under a contract which calls for its completion by November 1, 1872.

Dubuque & Monroe.

An effort is making to extend the Monroe Branch of the Milwaukee & St. Paul Railway westward to Dubuque, about 65 miles through a difficult country. Parties offer to construct it if \$250,000 is subscribed by the towns on the line and the right of way secured.

Grand Trunk.

Newspapers in London have been discussing the probability and advisability of a lease of this road to the Northern Pacific, which would have to construct several hundred miles of unprofitable road in order to make a connection with it. It is noticeable that Grand Trunk proprietors are quite ready to let or sell or listen to any proposition which suggests an income on Grand Trunk stock or bonds.

Wilmington, Columbia & Augusta.

The Augusta (Ga.) *Chronicle* of the 22d ult. says: "For some time past this company has been engaged in the construction of a railroad between Sumter and Columbia. It lacks now only about 700 feet of completion, and this gap will be filled in a few days. On the 10th of December, the company expects to open the new line for the transaction of business. It was originally intended to build this road through to Augusta from Columbia, and the route between the two cities was surveyed, but a policy was adopted which rendered this unnecessary. Several months ago the controllers of the company bought up enough of the stock of the Charlotte, Columbia & Augusta Railroad to give them control of that corporation, and the lines from here to Columbia and from Columbia to Wilmington will be operated as one."

Pittsburgh, Cincinnati & St. Louis.

This company is laying a second track from Pittsburgh to Steubenville, 43 miles.

Northern Pacific.

The Board of Directors of the Northern Pacific Railroad Company have passed the following resolution:

Resolved, That land exploration tickets over the Northern Pacific Railroad be sold at full fare, and that persons who take such tickets and within sixty days thereafter purchase lands of the company to the amount of forty acres or more, shall be credited the fare on their purchase and be entitled to free tickets for themselves and families when going to settle upon the lands purchased.

The following resolution was adopted by the Committee on Lands Nov. 17, 1871:

Resolved, The chairman is hereby authorized to proceed in his discretion to organize a system of nurseries of forest and other trees on the line of the road, and to take the necessary steps in employment of persons, and otherwise to put the system in operation.

These steps, of course, are intended to encourage immigration to the country on the line of the road, without which the road will be valueless.

Schuylerville & Upper Hudson.

Mr. L. N. Cramer, the Engineer of this railroad, writes to us as follows under date of November 20: "Commencing at Mechanicsville, on the Rensselaer & Saratoga Railroad, and following the Hudson River to Schuylerville, a distance of fifteen miles, thence crossing river and running near its east shore to Fort Edward, an additional distance of twelve miles, making twenty-seven in all. At Fort Edward it again intersects the Rensselaer & Saratoga Railroad, having shortened the distance just ten miles. There are nine continuous miles of level grade, and with the maximum at thirty feet, the curvature is light. The road from Mechanicsville to Schuylerville has been under contract since July, and there is now about eight miles ready for the iron. The remainder is to be completed so as to have that portion of the road in running order by the coming summer. The upper part is also to be pushed toward completion at an early date."

Toledo, Peoria & Warsaw.

The freight business on this road is unusually large, and the company has ordered 500 new freight cars, 280 of which the Illinois Central Company is constructing in Chicago, and the remainder are to be made at car works in Lebanon, Ohio. The company has recently turned out at its works in Peoria a new and very handsome passenger coach. Eight of its passenger engines are now equipped with the Westinghouse brake, and the entire passenger stock is to be fitted with it.

Trains were to commence running through between Peoria and Burlington, Iowa, November 27.

Spirit Lake & Sioux Valley.

Mr. E. T. Hill, the Engineer, has completed a survey of this proposed new railroad in Northwestern Iowa, and found the route favorable. It is intended to construct it into Minnesota as far north as Jackson.

Columbus & San Antonio.

The Gonzales (Texas) *Index* of November 10 reports that at that time a force of 300 men was working on this new Texas railroad.

Houston & Great Northern.

This company expects to have its line completed to a point about eight miles north of the Trinity River and 90 miles north of Houston by the 1st of January, after which it will suspend work until its land grant is secured to it.

Grand Rapids & Indiana.

Green & McKillip, contractors on the extension of this railroad, report that men will be kept at work all winter on the line north of Clam Lake, and that it will take until about the 1st of July to prepare the section for the iron, as it will average 20,000 cubic yards of excavation to the mile along the whole section.

South St. Louis & Union Depot.

Under this name, says the *St. Louis Journal of Commerce*, a company has recently been organized to build a road from a point on the Pacific Railroad, just west of Grand avenue, to Carondelet. The route is being surveyed, passing through the depression between Shaw's Garden and Grand avenue, down the valley of Glade Creek to the Mississippi River, near the Vulcan Iron Works. This line will afford the Missouri Pacific and the Atlantic & Pacific a connection with the river and the proposed new bridge at Carondelet, and also enable the Iron Mountain Railroad to reach the great Union Depot. The building of this road will obviate the necessity of the branch road projected from Kirkwood or Laclede.

St. Louis, Salem & Little Rock.

Under this name a company proposes to construct a railroad from Cuba, on the Atlantic & Pacific Railroad, 90 miles from St. Louis, nearly due south 30 miles to Salem, Dent County, on the line of the proposed Laclede & Fort Scott road, and thence southward to Little Rock, Ark., 150 miles. It is reported that the part south of Salem will be constructed as a branch of the Laclede & Fort Scott road. The proposed line would have a wide but thinly-peopled route entirely to itself.

Southern Railroad Combination.

The Washington correspondent of the *Boston Advertiser* says: "The recent extensive purchases and leases of railroads in the Southern States, which were supposed to have been effected by parties connected with the Pennsylvania Company, turn out to be the work of an independent organization, controlled by Baltimore capital. Among parties concerned in the enterprise are W. I. Walters, Alexander Brown & Sons, General O'Donnell, Messrs. Thomas C. Jenkins, Horace Abbott, Thomas Kensett, George Bartlett and B. F. Newcomer, of Baltimore; M. K. Jesup & Co., D. Willis James and Roosevelt & Son, of New York; Drexel & Co., P. A. & F. Sewall and Whitney & Sons, of Pennsylvania; and D. Jones, of Liverpool. Over \$7,000,000 has already been expended in actual cash, and up to the present time, by the purchase of stock and controlling majorities, a number of the most important lines of railroad, comprising in all 1,425 miles, has been secured. Besides this, control has been obtained under a lease of 363 miles additional. The new company now controls both the main lines south from Richmond, the North Carolina roads, the chief roads of South Carolina, two main roads in Georgia and the important lines of East Tennessee. These combined Southern lines will have direct communication north of Richmond with Washington, Baltimore, Philadelphia and New York, both through the present lines and by others to be built in friendly alliance with the new organization."

California Railroads.

The *San Francisco Chronicle* of November 9 says:

"The Central Pacific Railroad Company are now operating fourteen hundred miles of railroad, and are rapidly extending their lines in various directions. The San Joaquin Valley Branch, for which a subsidy was asked at the last session of the Legislature, is being extended southerly from Lathrop to Bear Creek, a point distant only 90 miles from Visalia, Tulare county. When completed to Bear Creek, all the travel for points in the San Joaquin Valley as far as Visalia will, instead of going by rail to Gilroy and thence over the mountains 140 miles to Visalia, take the railroad to Bear Creek, whence the road is level over the plains. Freight and travel to the Kern county mines will, instead of going by the way of Los Angeles, also follow the San Joaquin Valley road. The company are actively advancing, and the cars will soon be running to Bear Creek."

"Work on the Oregon Branch of the Central Pacific is being vigorously prosecuted, and in a few days the people of Red Bluff will be in direct railroad communication with San Francisco."

"The same company are building a road starting at a point two miles from Bantas, on the Western Pacific—where they have secured 480 acres of land for a town site—to Antioch, or tidewater on the San Joaquin River. This is a section of the line that is to run from Oakland to Antioch along the bay shore. The Southern Pacific road, owned by the same company, from San Francisco to San Jose, is being improved. The old chair-joint rails are being replaced by the more substantial fish-joint rails, and heavy ties are being laid to prevent the unpleasant jar incident to railroad travel."

"The Southern Pacific is being rapidly extended under the Central management southerly from Gilroy. A branch road has been run from Gilroy to Watsonville, in Santa Cruz county. Watsonville is located at the southern end of Santa Cruz county, and the people of the town of Santa Cruz, twenty miles north, are now anxious to be connected with San Francisco by rail via Watsonville."

Chicago, Danville & Vincennes.

Trains have been running regularly between Chicago and Danville on this new railroad for about two weeks. The first train entered Danville on the 16th ult.

Narrow-Gauge Suburban Railroad.

A company has been organized in St. Louis to build a narrow-gauge railroad from Grand avenue and Olive street to Keimlen avenue, to be operated with locomotives for suburban traffic. Erastus Wells is President; W. M. McPherson, Vice-President; L. D. Dameron, Treasurer, and L. H. Conn, Secretary.

Boston & Albany.

The *Springfield Republican* says that this company proposes to build a new piece of road, leaving their track between Cottage Farm and Alston, and running through Brighton Center and Newton Lower Falls to a point on the present road near Grantville. It will be an air line, and will save a mile of travel. The charter given for a branch railroad from Alston to Brighton Center will probably be merged in the new undertaking.

West Point & Birmingham.

Engineers are making surveys for a proposed narrow-gauge railroad from West Point, Ga., to Birmingham, Ala.

Wisconsin Central.

The Eastern Division of this important Wisconsin railroad, from Neenah and Menasha west to Stevens' Point, 64 miles, is now completed and in operation. A train connecting with the Chicago & Northwestern leaves Neenah and Menasha at 8 a. m. each day, and arrives at Stevens' Point at 12:30 p. m.; returning it leaves Stevens' Point at 2 p. m. and reaches Neenah and Menasha at 6:30 p. m. This road has been entirely constructed during the past season, and work is now progressing on 40 or 50 miles beyond Stevens' Point. Phillips & Colby, the contractors for the construction of the entire line, are operating the road. They have displayed great energy in pushing through the work, and have been able to work to great advantage, because of the universal confidence reposed in them. Contractors of higher character and more thoroughly trustworthy never built a railroad.

St. Louis & Iron Mountains.

This company not being able to obtain the land and right of way it wants for a large passenger station near the junction of Fourth and Fifth streets (quite "down town"), in St. Louis, is now, it is said, contemplating the construction of a line further west and a station in connection with the Missouri Pacific, at some distance from the center of business, and arrangements for crossing the Mississippi as far south as Carondelet.

It is also reported that this company proposes to remove the main shops from Carondelet to De Soto, which is 43 miles south of St. Louis. It needs more space, which is somewhat costly at Carondelet and very cheap at De Soto.

A new station on the Arkansas Branch of this road, at the summit of the divide between Big Creek and McKenzie Creek, in the midst of a pine forest, is called "Gad's Hill."

The company has recently purchased the transfer ferry steamer North Missouri, with which to transfer freight across the Mississippi at St. Louis. It, however, cannot transfer loaded cars to advantage, as none of the roads east of the river have its (5-feet) gauge.

Carondelet Bridge.

The *St. Louis Journal of Commerce* has the following concerning the proposed bridge across the Mississippi at Carondelet, six miles south of St. Louis:

"The bridge is to consist of two spans, four hundred and thirty-seven feet in length, each, and to be fifty feet above high water mark, giving ample room for the passage of the largest boats. The length of the bridge, from shore to shore, including trustle-work, will be 2,174 feet. The bridge will be of iron and adapted for railways, with a crossing for wagons, etc., below. The estimated cost of the bridge is \$2,000,000. Charters have been obtained from the States of Missouri and Illinois, the stock is subscribed, and work will soon be commenced. The company contemplate having the bridge completed within two years from the first of January—the charter requires its completion within three years. Plans have been solicited from the most eminent engineers of the country, and two have already been received and others are in course of preparation to be submitted in a few days."

"When this bridge is completed, and a branch road built from Carondelet to a junction with the Missouri Pacific, at Laclede, or some point in the vicinity, a new impetus will be given to the development of the iron mines of the Southwest, as shipments can be made direct to the furnaces or to river boats, without the expense and delay of transfer; the cattle cars, instead of passing through the city, will be taken through South St. Louis, where ample grounds have been secured for extensive cattle yards, and the grounds for complaint at the expense and delay of transferring freight through the city will be removed. Another important matter to be accomplished will be the superior facilities afforded to iron manufacturers at Carondelet, as both iron and coal will be brought directly to the several furnaces, on the same cars, from the mine to the stock-house of the furnace."

Chester & Ironton.

The *Ironton (Mo.) Enterprise* says:

"We have a report that a thoroughly reliable company has been organized and the funds secured for building a railroad from Ironton to St. Mary's Landing on the Mississippi River, opposite Chester, Illinois. The length of a road to that place would be about 45 miles, and would be the shortest which could be found to connect our mineral region with the coal fields of Illinois. It is said that our iron companies are so confident of the completion of this road that they do not make any calculations on burning charcoal after this winter, but hope to be able to secure fuel from the coal deposits of our neighboring State."

Such a road would not only connect directly the great iron district of Missouri with the exceptionally fine Chester coal, but would also give it a short route to the Mississippi, where it could be shipped to any manufacturing point on the Mississippi or the Ohio at very low rates.

Montgomery & Eufaula.

This railroad is now completed from Montgomery, Ala., southeast to Eufaula, over the Chattahoochee River, a distance of 80 miles. Forty miles of it, from Union Springs to Eufaula, has been constructed this season. At Eufaula it connects with the Southwestern Railroad of Georgia, for Macon, Augusta, Savannah and the North, and where the western terminus of the Brunswick & Albany road will be.

Louisiana & Missouri River.

Mexico, Mo., will give this company \$10,000 if it will construct its shops there.

Memphis & Little Rock.

The *Pine Bluff (Ark.) Republican* says that a contract has been executed in the sum of \$2,000,000, providing for the immediate construction of the Pine Bluff Branch of the Memphis & Little Rock Railroad.

Little Rock & Fort Smith.

The *Fort Smith (Ark.) Patriot* says that the difficulties which have delayed the extension of this road are likely to be adjusted and work to be resumed directly.

Ohio & Mississippi.

The general offices of this company, heretofore partly in Cincinnati, have been concentrated at St. Louis. The Treasurer and supply department were removed Nov. 19. It is understood that arrangements have been made by which the trains of this road will run over the Louisville Bridge into Louisville.

Northern Central of Michigan.

The grading of this railroad (which is to be a branch of the Lake Shore & Michigan Southern) is substantially completed from Jonesville north to Homer, and is well advanced from the north. The bridges are going up, and a considerable quantity of iron is on hand. A lack of ties delays track-laying somewhat, many which had been got out having been destroyed by the recent fires.

Oshkosh & Mississippi.

The track of this railroad was completed on the 21st ult. from Ripon, Wis., northwest to Oshkosh, 20 miles. It was expected that the bridge over the Fox in Oshkosh would be completed by the end of the month, thus admitting the trains of the road to the north side of the river, where its depots are. At Ripon the road connects with the Milwaukee & St. Paul Railway, and the road will give Oshkosh a better connection than heretofore with Milwaukee, its only railroad heretofore being the Wisconsin Division of the Chicago & Northwestern.

Old Colony & Newport.

This railroad is 72½ miles long (Boston to Newport, R. I.), and has branches amounting to 50 miles more. The following is the income and expense account for the twelve months ending September 30, 1871:

INCOME.	
From passengers.....	\$1,020,573 16
" freight.....	525,812 57
" express.....	74,793 86
" rents.....	26,433 13
" mail.....	16,361 42
" miscellaneous income.....	5,488 02
extra baggage.....	2,016 35—\$1,671,478 51
EXPENDITURES.	
Passenger department.....	\$142,487 67
Merchandise department.....	174,312 65
Locomotive department.....	262,274 12
Maintenance of way.....	274,064 72
General expense.....	93,353 12
Miscellaneous expense.....	49,345 02—\$895,541 90
Earnings after deducting expenses.....	\$675,936 61
United States, State, city and town taxes.....	\$26,400 73
Interest on bonds and debt.....	190,282 36—\$267,224 09
Net earnings.....	\$408,412 52

The operating expenses are thus seen to be 59½ per cent.

Connecticut Central.

East Windsor has voted against a proposition to subscribe \$50,000 to the stock of this railroad, which it is intended to construct from Portland, Connecticut, opposite Middletown, northward near the east bank of the Connecticut river to Springfield, Mass. A two-third majority is required to carry such a proposition in Connecticut.

New London Northern.

It is reported that negotiations for the lease of this railroad by the Vermont Central have been completed. The lease will run ten years, at an annual rental of \$240,000, and includes the three steamers owned by the New London road, and running between New London and New York. The New London Northern extends from New London, Conn., northward to Grant's Corners, near the northern border of Massachusetts, where it forms a junction with the Vermont & Massachusetts Railroad, which is operated by the Vermont Central.

Connecticut River.

The *Springfield (Mass.) Republican* of the 21st ultimo says:

"At the meeting of superintendents held at Bel-lows Falls, last week, the usual winter arrangements were made for the Connecticut River Railroad. After the 27th of November the 8 o'clock train north will reach South Vernon at 10:05, instead of 9:55, as at present, and the evening train south, which now leaves Northampton at 6:45, will start at 7:16. The desired change by which the 8 o'clock train north should make close connection with the Boston train, thus allowing a through trip to Montreal in a single day, was not effected, and the connections will continue according to the usual winter arrangement."

Lake Ontario Shore.

Of the 50 miles of the grading of this road let last summer, 30 is ready for the ties, the heaviest part of the masonry is completed, and work is well advanced on the rest.

Wilmington & Western.

In connection with this railroad surveys are making for narrow-gauge lines extending westward near the southern border of Pennsylvania as far west as the Han-over Junction, about 80 miles from Wilmington. Oxford and Landenberg are points on the line, and it is proposed to construct a branch line from Oxford northward to Lancaster, about 25 miles.

Arkansas Central.

This company on October 23d, awarded to Andrew Frame & Co., the contract for the completion of the Pine Bluff Branch from the main line to Pine Bluff, the work to begin November 1st, and be finished by February 1st, 1872. The contract for building the road from White River to Little Rock was let to L. C. Gregg & Co., and Sharpe, Shaw & Co., all to be completed by March 1st, 1872. The contract for building a bridge over White River was let to S. B. Beaumont & Co., at \$60,000, and is to be completed by February 1st.

Lexington & Utica.

Schuyler County, Mo., will subscribe \$50,000 to this proposed road if Lancaster and Queen City are made stations on it. The route proposed is from Lexington on the Missouri northwest in the direction of Burlington, Iowa, and Schuyler County is next to the Iowa line.

Terre Haute & Cincinnati.

Bartholomew county, Ind., has voted to subscribe \$100,000 to this road.

Flymouth, Kankakee & Pacific.

This company's bridge over the Illinois, at Hennepin, Mr. Nicholl, the engineer, informs us, will be, with the approaches, 1,300 feet long. The bridge proper will be a Howe truss, consisting of four spans of 150 feet each, and a draw of 300 feet, and will be 34 feet above low water. It will cost about \$90,000, and the approaches, which will be of trestle work on piles, will cost about \$10,000 more.

Marysville & Lexington.

This railroad is now in operation from Marysville, Ky., southward to Carlisle, very soon will be completed to Millersburg, and in a very short time to Paris, Ky., thus opening a new route from the Ohio River to the famous blue grass region of Central Kentucky.

Wheeling & Toledo.

The second branch of the Wheeling Council adopted a resolution directing the Railroad Committee to petition the legislature to authorize the Council to subscribe \$300,000 to the projected railroad from that city to the Northwest. It was supposed until recently that the Legislature passed a bill last winter authorizing a subscription of \$200,000; but an examination of the acts when published showed no such act among them. The representatives from Ohio county supposed the bill was passed, and it has not been ascertained whether they were mistaken or whether it was omitted from the public volume by accident.

Lake Shore & Tuscarawas Valley.

This road, recently completed from Cleveland southward to Medina, it is intended to have completed to Denison, on the Pittsburgh, Cincinnati & St. Louis Railway, by October, 1872.

Kentucky & Great Eastern.

Under date of November 18, a correspondent in Mayville, Ky., writes: "Recently Mason county, Ky., voted by 800 majority to subscribe \$400,000 stock in the Kentucky & Great Eastern Railroad; Lewis county votes December 2 on a proposition to subscribe \$100,000 to the same enterprise. It is expected that Greenup and Boyd counties will order an election for a like purpose in a few weeks. The recent unnavigable condition of the Ohio river has clearly shown the absolute necessity of this railroad. Making large allowance for the extravagant statements of the officers of this road, there yet remain very strong and solid reasons why this road should be completed within two years."

This is very true. There is now no railroad north of the proposed line of the Kentucky & Great Eastern within forty miles for most of the distance, and on the south none for two hundred miles. The Lexington & Big Sandy, however, will probably be built as soon as the Great Eastern, but that will not be too near to greatly limit traffic from that direction, and if the line has no other connections east of Kentucky, it would be a valuable feeder of the Chesapeake & Ohio.

Baltimore & Ohio.

At the annual meeting of this company in Baltimore, on the 20th inst., the report of earnings of the year showed that the revenues of the road and its branches for the fiscal year was \$12,557,529, an increase over the previous year of \$1,177,158.

Chesapeake & Ohio.

The track of this railroad is now all laid between the western terminus at the new city of Huntington, W. Va., on the Ohio, eastward to Charleston, the capital of the State, about 50 miles, and it is intended to have trains commence running December 4.

Dunkirk & Elmira.

A company is organized and is trying to obtain local subscriptions to secure the construction of a narrow-gauge railroad from Dunkirk, N. Y., southeast about 35 miles to Randolph, Cattaraugus County, on the Atlantic & Great Western Railroad 17½ miles east of Salamanca, and thence southward down the Allegheny River about as much further to Kinzua, on the Philadelphia & Erie Railroad 20 miles southeast of Warren, intended to give an outlet to Dunkirk to the Kinzua coal mines.

Dunkirk & Warren.

This company, which has its road completed and in operation from Dunkirk south to Warren, 54 miles, according to the *Corry Republican*, is about to extend its line to Titusville, Pa., by constructing a line along that of the Philadelphia & Erie from Warren west to Garland, 15½ miles, and thence southwestward down the Mulling valley direct to Titusville, about 20 miles. Col. J. Condit Smith is conducting the surveys for this extension.

Pennsylvania's Petroleum Railroad.

The Titusville *Courier* announces the letting of the contract for the construction of this railroad from Tidoute westward to Cambridge, Penn., about 40 miles, to Belden & Co., of Syracuse, N. Y. The route is from Tidoute, on the Oil Creek & Allegheny River Railroad, 38 miles northeast of Oil City, a little south of west by way of Enterprise to Titusville, and thence northwest to Cambridge, which is a station on the Atlantic & Great Western road 14 miles north of Meadville. A branch from Enterprise southward through Pleasantville and Shamburg to Pithole, 10 miles, is also let. It reports that an extension from Cambridge north to Erie, about 30 miles, will be let soon. The *Courier* says:

"The stock of this road has all been taken by English capitalists. The bankers in London will be Messrs. Bisschoffschmidt & Goldschmidt; Duncan & Sherman, of New York, will do the general banking business on this side of the water."

Erie & Corcosse Valley.

This railroad is now completed from Mount Morris, in Livingston County, N. Y., southeast 24 miles to Dansville. The Erie Railway Company has leased it, and agreed to continue it southward from Dansville, about 18 miles to Burns, which is on the Erie's Buffalo line 10 miles northwest of Hornellsville.

Railroads and Telegraphs in Mexico.

From the recent official reports to the Mexican Congress, the following statistics of the railroads and telegraphs of that country are taken:

RAILROADS.	Length.	
	Kilometers.	Meters.
From Mexico to Puebla.....	186	278
" Vera Cruz to Paso del Mochi.....	75	..
" Vera Cruz to Loma Alta.....	35	..
" Vera Cruz to Medellin.....	12	..
" Mexico to Tacubaya.....	8	..
" Mexico to Tlalpán.....	24	250
" Mexico to Guadalupe.....	6	700
Or 216 miles.	347	228

LINES OF TELEGRAPH.	Length.	
	Kilometers.	Meters.
From Mexico to Cuernavaca.....	83	800
" Mexico to Toluca.....	67	49
" San Luis to Zacatecas.....	184	390
" Zacatecas to Durango.....	54	470
" Tehuacan to Oaxaca.....	212	353
" Vera Cruz to Tampico.....	288	500
" Mexico to Vera Cruz, Tehuacan, Tlaxcala, and Toluca.....	1,047	500
" Leon to Guadalupe and Manzanillo.....	646	260
Or 1,642 miles.	2,643	280

This country, with 216 miles of railroad, has a population of nine millions, or nearly one-fourth as much as the United States, which has nearly 60,000 miles of railroad.

Lake Erie & Louisville.

The certificate of the Lake Erie & Louisville Railroad Company has been filed with the Secretary of State at Indianapolis. The road was sold under a decree of the United States Circuit Court, on the 27th of last July, and purchased by G. E. M. Davis, on a mortgage bond, as trustee. Now George E. M. Davis and other parties have associated themselves together to form a corporation, to be known as the Lake Erie & Louisville Railroad Company; the number of directors shall be nine, and the period of services of such directors shall be one year. The amount of capital stock shall be \$3,600,000; such capital stock shall be divided into 70,000 shares of \$50 each.

Great Western of Canada.

In the speech of Mr. Thomas Dakin, the President of this company, and late Lord Mayor of London, at the recent semi-annual meeting in London, he spoke as follows of the "Canada Air Line" which this company is building from Glencoe to Fort Erie, opposite Buffalo:

"The construction of the Glencoe line was progressing most satisfactorily; it was 100 miles in length from Glencoe to Canfield, where it was originally intended to join the Grand Trunk line. The cost of it would be 9½ per cent. under the estimate of Mr. Reid, the company's engineer. It would be completed in the early part of next year, and they hoped it would be ready for traffic by the time the International Bridge at Buffalo was opened for traffic. The portion of the line from Canfield to Fort Erie was about 42 miles, and they had been in negotiation with the Grand Trunk Railway Company to make a line within their fences, but on full consideration of the matter, they thought it would not be wise to trust the large traffic they were likely to have over a single line, and for the use of it to pay half the cost; and then they would have to make a second line, which would not be so satisfactory as having their own line. The negotiation went off. They were to have had a part of the Buffalo Bridge, and if it had been as first proposed they might have had it, but that negotiation had also passed over. He thought their interests would be best served by having an independent line of their own from Canfield to Fort Erie, on which they would lay steel rails under the management of their own officers. The board had come to the resolution to make that line themselves, as they found the terms required by the Grand Trunk for the use of their line and land would come nearly to the same sum as the continuation of their own line from Canfield to Fort Erie."

Jefferson City, Lebanon & Southwest.

Mr. J. Edward Belch, the President and Managing Director of this company, is to canvass Miller, Camden and Lacke counties, Mo., to solicit aid for this railroad, and the counties of Moniteau and Morgan, in favor of a branch of the same road to Versailles. He is also to attempt to revive a project for the construction of a railroad from Jefferson City to St. Louis, along the Missouri, crossing to the north side at Howell's Ferry.

Colorado Railroad.

In the *Greeley Tribune* of late date the following statement is made:

"Railroad affairs are exceedingly active in Southern Colorado. First, we have it positively announced that the Kansas Pacific is to run a line from Kit Carson to Fort Lyon, on the Arkansas, which would almost certainly secure for this road the trade of the Arkansas Valley and of New Mexico. But now we hear that the Denver & Rio Grande, recently completed to Colorado City, is to be extended to the Arkansas River, probably at Pueblo, which gives this road an inside line in regard to Southern Colorado trade. When it is considered that the tillable land of that part of our Territory is much less than that in our region, we would seem to be somewhat behind, unless the Pine Bluff, Greeley & Golden City road shall be entered upon with vigor."

"Mr. Titcomb, who has been on the survey of the Pine Bluff, Greeley & Golden City road, has returned. He reports that a good line was found, with no grade higher than sixty feet to the mile, and that the estimates are to be sent in at once."

Chicago & Illinois Southern.

The route of this railroad, projected some years ago, is from Decatur, Ill., southeastward through Mattoon to Olney, and thence more directly southward to Mount Vernon, near the southeast corner of Indiana. The Indiana part of the road is nearly, if not quite, completed. The Decatur, Sullivan & Mattoon road, now nearly completed, will supply the northwestern section, and now it is said that as soon as the latter is done work between Mattoon and Olney will be commenced.

Grand Trunk.

The following statements were made in the speech of Mr. Richard Potter, the chairman of this company, at the last semi-annual meeting in London:

"With regard to the negotiations which have taken place during the half-year with the Great Western of Canada, my impression is that if the directors of that company had not been from the first desirous of having a line of their own, those negotiations would have resulted in an arrangement between the two companies. But I think from the first that they have never entirely and frankly accepted the idea of a joint line with us. We offered to let them into all the rights of the bridge—joint ownership—upon undertaking half the liabilities of the bridge capital, without any premium or payment of any kind. That is to say, they were to be jointly liable with us for the bridge capital; they were to become joint owners of the bridge; the bridge would be worked by a joint committee composed of the officers of the two companies, and the two companies would jointly receive any foreign tolls for passing over the bridge. At the same time we offered to make them joint proprietors of the whole of our line from Fort Erie to Canfield, including full provisions for sidings for their traffic; including also the laying of ten miles of steel rails; and including and undertaking from us that the whole line should be delivered up to them on this condition—in the first place, with ten miles out of forty laid with the best steel rails, but with respect to the other thirty miles, in a condition equal to the best parts of the Great Western itself, laid with iron. And we asked for that joint ownership £100,000, or less than one-half of the cost of the line to us. But we added that if that £100,000 were considered too large a sum, we were willing to leave it to arbitration to settle what was the fair value of the line. But, as I said before, my impression is that there was from the first lurking in the minds of an influential section of the Great Western, either in London or in Canada, a strong desire to have an independent line of their own."

"I may say that we have been very successful in making a favorable arrangement with Mr. Joy, the president of the Michigan Central at Detroit. He has admitted us into his station at a very reasonable sum, and so anxious is he to work harmoniously with the Grand Trunk, notwithstanding his close connection with the Great Western of Canada, that I am quite satisfied, from what I remember of Detroit itself, that in the facilities he has given us, he has admitted us in on liberal and advantageous terms."

Wheeling & Lake Erie.

Of this company the *Wooster (O.) Republican* says:

"The company was organized September 20, 1871, at Bowerstown, Harrison County. It proposes to start its line at the head of Wheeling Island, running thence through the counties of Belmont, Jefferson, Harrison, Carroll, Tuscarawas, Stark, Wayne, Medina, Ashland, Huron, Ottawa, Sandusky, to Toledo, in Lucas. It passes through the following towns: Martin's Ferry, Hopedale, Fairview, Bowerstown, Leesburgh, New Cumberland, Zoar, Bolivar, Navarre, West Lebanon, Apple Creek, Wooster, Congress, West Salem, New London, Norwalk, Milan, Sandusky, and thence to Toledo."

"The intrinsic value of this road is easily demonstrated by enumerating some of its connections. At Wheeling, it connects with the Baltimore & Ohio and Hempfield roads; at Martin's Ferry, with the Cleveland & Pittsburgh road; at Fairview, with the Pan Handle; at Zoar, with the Tuscarawas Branch of the Cleveland & Pittsburgh; at Apple Creek, with the Cleveland, Mt. Vernon & Delaware; at Wooster, with the Pittsburgh, Fort Wayne & Chicago; at West Salem, with the Atlantic & Great Western; at New London, with the Cleveland, Columbus & Cincinnati; at Norwalk, with the South Division of the Lake Shore, and at Sandusky, with the North Division of the Lake Shore road."

Concerning the same road the *Toledo Commercial* says:

"The managers are pushing the enterprise with vigor. They report that substantial encouragement has been received along a greater part of the line. Already the right of way has been secured, with the exception of ten or twelve farms, to within six miles of Wooster. Eastern capitalists of substance, energy and integrity, propose to furnish \$16,000 per mile, provided the citizens along the route furnish \$10,000 per mile. The following subscriptions have been pledged for the road: Sandusky, \$200,000; Milan, \$50,000; Norwalk, \$100,000; New London, \$25,000; West Salem and Congress, \$40,000; West Lebanon and Apple Creek, \$45,000, on conditions: Navarre, \$50,000; Bolivar, \$15,000; Zoar, \$12,000; Connoton Valley, \$50,000; Fairview, \$10,000; between Fairview and the Ohio River, a distance of 25 miles, \$80,000; Martin's Ferry, \$20,000; Wheeling, \$300,000; making a grand total of upward of \$1,000,000."

"The distance from the head of Wheeling Island to Wooster is 85 miles; to Sandusky, about 150; and to Toledo, about 200 miles. The proposed route is represented to be eminently practicable, the heaviest grade being fifty-two feet per mile on the dividing ridge between the waters of the Connoton and the Ohio River. It passes through fifty miles of the richest coal fields in the State of Ohio, the veins of which range from four to eight feet in thickness. It strikes the Ohio River almost one hundred feet below inexhaustible supplies of coal."

Northern Wisconsin.

Concerning this company's road, which is to extend from Hudson, Wis. (a few miles east of St. Paul), northward to Superior City, opposite Duluth, a correspondent of the *Madison State Journal* says:

"This same road has now passed into the hands of the business men of one of the most enterprising cities of the West, and we see active measures inaugurated, even at this late time of the year. Bonds are called for and promptly voted by towns interested; the iron has been ordered, the grading rapidly being completed, and ties put down on the first section of twenty miles, and the cars will be running to New Richmond before snow flies. Before a year the track will be laid and locomotives whistling into Superior City, without a doubt."